

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

Founded in 1909

FIRST AERONAUTICAL WEEKLY IN THE WORLD

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

No. 1390. Vol. XXVIII.

AUGUST 15, 1935

Thursdays, Price 6d.
By Post, 7½d.

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditor, Sedist, London.

Telephone: ROP 3333 (50 lines).

HERTFORD ST.,
COVENTRY.
Telegrams: Autocar, Coventry.
Telephone: Coventry 5210.

GUILDHALL BUILDINGS,
NAVIGATION ST., BIRMINGHAM, 2.
Telegrams: Autopress, Birmingham.
Telephone: Midland 2971.

990, DEANSGATE,
MANCHESTER, 3.
Telegrams: Hiffe, Manchester.
Telephone: Blackfriars 4412.

26B, RENFIELD ST.,
GLASGOW, C2.
Telegrams: Hiffe, Glasgow.
Telephone: Central 4857.

**SUBSCRIPTION
RATES:**

Home and Canada: Year, £1 13 0
Other Countries: Year, £1 15 0

6 months, 16s. 6d. 3 months, 8s. 3d.
6 months, 17s. 6d. 3 months, 8s. 9d.

R.A.F. Flying Training

MORE haste, less speed is an old saying which, like other old sayings, does not always work out in practice. The need for haste sometimes produces an economy of effort which is good, and which might not have been adopted had events proceeded in a normal leisurely way. The expansion of the Royal Air Force has to be carried out at some speed, but undue haste in the flying training of pilots is a thing which must be avoided, and will be avoided. The old training methods, excellent as they were in many ways, could not hope to deal with the numbers of new pilots who have to be trained, and new methods have had to be adopted. The most striking feature of the new policy is that all elementary flying training for short-service officers and airman pilots is to be undertaken at civilian training schools instead of at the Flying Training Schools. There are to be thirteen civilian schools, including the four which previously existed for training officers of the Reserve. The names of eight of these new schools are given on the Royal Air Force page in this issue. After receiving elementary instruction in flying the pilots will then proceed to one of the R.A.F. Flying Training Schools, of which there are to be ten, exclusive of Leuchars which caters for the Fleet Air Arm. At the F.T.S. the pilot will receive advanced instruction, and on passing out he will be fully qualified to take his place in a fighter or bomber squadron. Pilots who are to go to army co-operation squadrons will still have to pass through the School of Army Co-operation, as this expansion scheme is intended to increase the home defence force, and is not directly concerned with the air arm of the Army.

The new scheme is good in many ways. Partly it resembles the methods in force in the pre-war days of the Royal Flying Corps, when officers had to learn to fly at civilian schools, and then were sent to the Central Flying School for advanced instruction and to learn

the work of a flying officer. Incidentally, this scheme will be of great help to a number of civil schools, and will thus put them in a stronger position for dealing with private pupils, whereby civil flying as well as the R.A.F. will benefit. It also shows progress in educational methods. Too many people seem to think that ability to fly an aeroplane is the whole of the matter. One might as well say that ability to ride a horse was the only thing needed to make a cavalry trooper. It is only after one has learnt to fly that one can begin real training as an officer of the Air Force. The elementary work can safely and suitably be left to civilian schools, while the Service schools concentrate on making the man who can fly into an accomplished pilot and a fully trained officer. Airmen pilots, too, need to learn all about formation flying, air navigation, gunnery, etc., as well as the tactics and practice of fighting or bombing.

A Temporary Measure

In the civilian schools there is bound to be a certain diversity of method in teaching pupils to fly. Different types of training machines are used at different schools. The Air Ministry restricts the types to those which it approves, namely, Avro "Cadet," the Blackburn "B.2 Trainer," the De Havilland "Tiger Moth," and the Miles "Hawk Trainer," all very good types. Any slight differences of practice which may come from the methods and machines of different schools will be harmonised in the higher instruction given at the F.T.S. The probability is that such differences will be but slight.

The new system should produce good results. It has been sanctioned as a temporary measure during the expansion of the home defence force. When that programme has been completed by March 31, 1937, the time will come to decide whether to maintain this system or to revert to the older system of training only Reserve pilots at civilian schools. It will be interesting to see what the decision will be.

Competition or Monopoly?

AIR transport is a business which has been subjected to much scrutiny in the United States since President Roosevelt summarily stopped the internal air mail services. The contracts for external services granted to Pan American Airways by previous Post Office administrations have been investigated by the present officials of the Post Office, and the whole question has been examined by a Federal Aviation Commission. An article on the subject is published elsewhere in this issue.

In the first case, the law obliged contracts to be advertised and competitive bidding invited, and the Post Office was convinced that this procedure would not give the best results. It decided, apparently, to give a monopoly of foreign contracts to Pan American Airways, holding that the best results would be obtained in this way.

Britain has also decided that the best results can be obtained by entrusting important overseas contracts to the one firm which has proved its ability to give good service, namely, Imperial Airways. The Australian Government has also been guided in the main by such considerations, though on occasions it has sprung surprises on the public by granting contracts for inland ser-

vices to the lowest tenderer, not always with the best results. As regards her internal air lines, the United States has tolerated fierce competition, and the result has been wonderful achievements in the way of speed. It is open to question whether the price paid for this speed has not been excessive.

Naturally, all the methods of placing contracts which have been followed in various countries have been severely criticised. Most people agree that in theory monopolies are undesirable, while undue competition may be ruinous, and acceptance of the lowest tender may not produce a service which is satisfactory in any way. Monopolies may prove extravagant to the State, and may result in lethargy of operation, while open competition by tenderers may put an undue value on economy to the State. A passage from the report of the U.S. Federal Aviation Commission drawn up last January may be quoted. The Commissioners wrote: "We do not believe that any rigid formula can be found for selecting air line operators. The award of a certificate of convenience and necessity ought to be based on experience, on responsibility, on reputation of the personnel concerned, on financial position, and on soundness of operating plans. . . . To attempt to allocate the right to run lines through a process of competitive bidding is to throw undue emphasis on economy at the expense of quality."



AMERICA'S LATEST: Recently reported as having made the 2,100 mile flight between Alameda, California, and Honolulu in 17 hr. 9 min., this Glenn Martin "Flying Clipper," which forms part of the new Pan American equipment, has cut the previous time for the journey by 50 min. The engines are Pratt and Whitney Twin "Wasps" driving constant-speed Hamilton Standard airscrews. Passenger accommodation is for about 46.

The Outlook

A Running Commentary on Air Topics

Atlantic Arrangements

RECENT developments point to the fact that the oft-discussed Atlantic air service may be in the news again shortly. In the first place, Mr. Ivor McClure, of the Department of Civil Aviation of the Air Ministry, has gone to Newfoundland, and it is reported that he will discuss the question of Transatlantic air bases with the Newfoundland Government.

Newfoundland is somewhat a bone of contention with American interests. Pan American have tried to get a concession to run an air line to there from New York, but their own laws make the granting of such concessions to American companies a matter fraught with considerable difficulty. The American Air Commerce Act decrees that concessions may not be given to foreign operators to run lines into the U.S.A. until acceptable concessions have been given by the foreign country in question to American operators. A very one-sided arrangement at which the British Government naturally jibbed.

Negotiations

AT the present time we believe Pan American Airways are themselves trying to negotiate direct with the Newfoundland Government—Newfoundland might conceivably make a base for a Transatlantic route *via* Greenland, a route for which Pan American are understood to have been given a concession by the Danish Government. Generally speaking, a more certain way of getting a concession in a case like this is for the matter to be dealt with between the respective governments direct and not through an individual company, and, perhaps, if the American Government were to show willingness to allow Imperial Airways to run to New York from Bermuda then the Newfoundland question would proceed more smoothly.

Other Developments

IT was a recommendation of the Federal Aviation Commission, whose report was laid before President Roosevelt early this year, that special attention should be paid to a Transatlantic service. We may therefore assume that American interests will be busy and to the forefront. Both Mr. Igor Sikorsky and Mr. Glenn Martin have told us that they are ready to supply suitable flying boats for such a service and Mr. Juan Trippe, president of Pan American Airways, says that their plans are also far advanced. It is only political and what may be called concessionary matters which seem to be delaying progress at the present time.

Irish Interests

APART from the agreement which Imperial Airways have with Pan American Airways—an agreement which, it may be presumed, will serve to further the interests of both companies—there is the Irish Transatlantic Corporation, Ltd., which has recently laid a report before the Air Ministry. Two Transatlantic routes are dealt with; Mr. C. H. Glendining, director of the corporation, suggests a service which will run from Galway to Botwood, Newfoundland and from Londonderry to Sydney, Nova Scotia. It has also been suggested that Galway should be developed as the European terminal for Transatlantic steamship services, the continuation to London and other European capitals being by air.

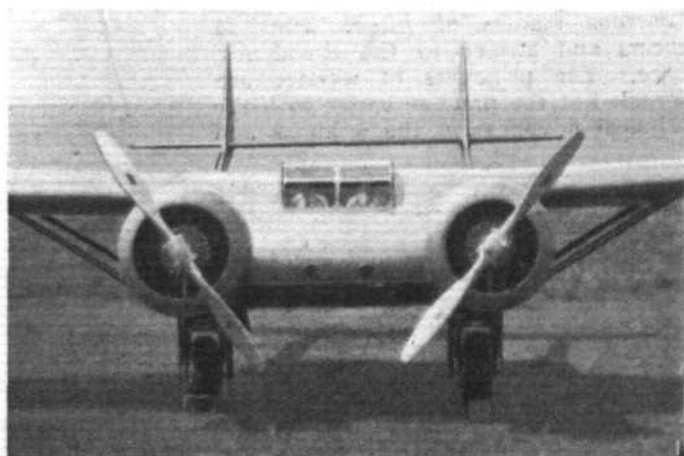
In the meantime, Imperial Airways and Pan American Airways are trying to get permission to use the Azores, but we gather that experts agree that considerable harbour developments will have to be undertaken there before it would be a safe stopping place for regular flying boat services.

Try Again, Black

CAMPBELL BLACK'S attempt on the Capetown record last week, in a new D.H. "Comet," was meritorious even though he and his co-pilot, McArthur, got no farther than Cairo. Insufficient oil seems to have been the cause of their abandoning the flight, and their return flight in 12 hr. 15 mins., only 1 hr. 2 mins. more than the outward flight, showed that there can have been little wrong with the engines. Presumably their flight to Cairo constitutes an unofficial record. Probably it will be found possible to start again at the end of this week, and then we hope Mr. Cyril Nicholson's enterprise in sponsoring the attempt will receive its just reward.

High Speed

ATOP speed of 270 m.p.h. is being claimed for the latest version of the Bristol all-metal low-wing two-engined monoplane. It is early yet to say whether this speed can be used economically, that is, commercially, or whether the price which has been paid by high horse power is too great to make the machine the sort to which operators will look to pay their dividends. The fuselage was exhibited at the Paris Aero Show at the end of last year, and at that time it was understood that engines of less than 400 h.p. would be fitted. The new model, built to the order of Lord Rothermere, has "Mercury" engines of about 645 h.p. each. Reports from Martlesham Heath seem to indicate that the flying qualities are excellent and that features like retractable undercarriage (electrically operated), flaps, controllable-pitch air screws, and careful attention to "cleaning up" have all worked together in an exceptionally happy manner.

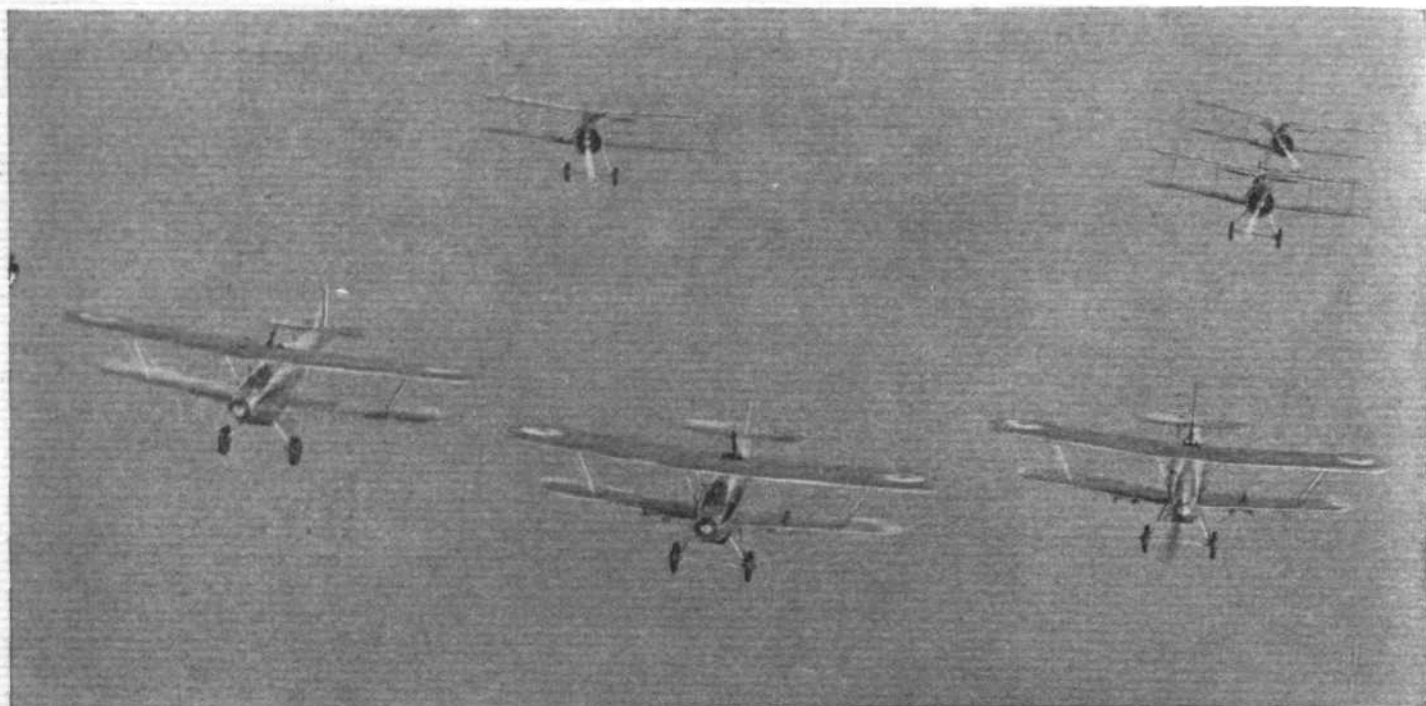


AROUND THE WORLD NON-STOP? A "nose-on" view of the Burnelli UB 14 in which Clyde Pangborne hopes to make an attempt to fly around the world, refuelling from other aircraft on the way. A feature of the machine is the aerofoil section fuselage. Note the pilots' position.

AIR FIGHTING

When Fighter and Bomber Come to Grips : The Search for the "Blind Spot" : Why Bombers Keep Formation

By MAJOR F. A. de V. ROBERTSON, V.D.

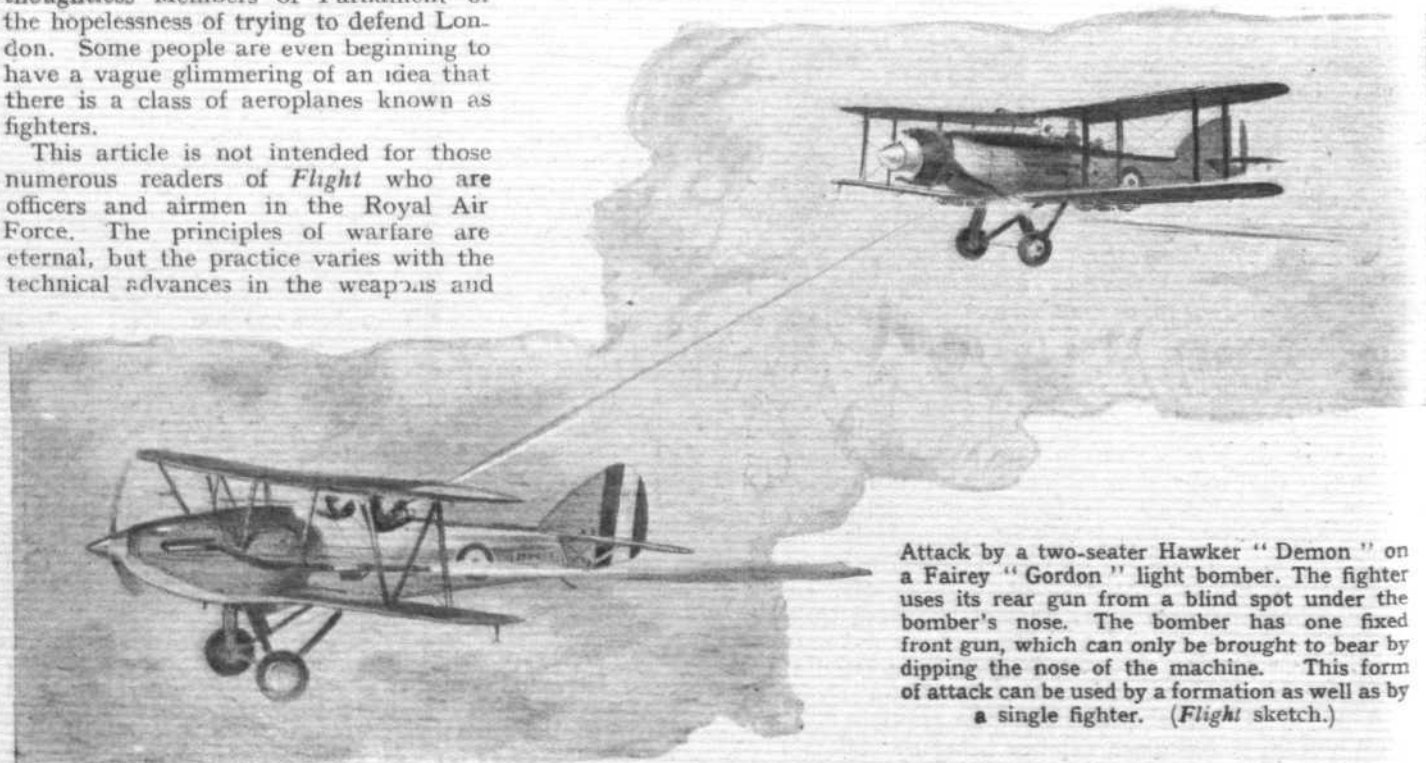


An attack by three Gloster "Gauntlet" single-seater fighters on three Hawker "Hart" light bombers. The fighters are partially covered by the tails of the bombers. (*Flight* photograph.)

THE recent Air Exercises, following upon the recent decision to treble our Air Defence Force, have aroused considerable interest in the chances of successful defence. It is noticeable also that the public is taking a more intelligent and better-informed interest in the matter than of yore. There is less wild talk by thoughtless Members of Parliament of the hopelessness of trying to defend London. Some people are even beginning to have a vague glimmering of an idea that there is a class of aeroplanes known as fighters.

This article is not intended for those numerous readers of *Flight* who are officers and airmen in the Royal Air Force. The principles of warfare are eternal, but the practice varies with the technical advances in the weapons and

equipment employed. The heads of the R.A.F. may know of some new invention, some "death ray," or some development of television which will alter present tactics. Laymen, however, may find some interest and profit in reading about the functions of a fighter aeroplane, and, even if the whole truth is not told, civilian readers will probably learn



Attack by a two-seater Hawker "Demon" on a Fairey "Gordon" light bomber. The fighter uses its rear gun from a blind spot under the bomber's nose. The bomber has one fixed front gun, which can only be brought to bear by dipping the nose of the machine. This form of attack can be used by a formation as well as by a single fighter. (*Flight* sketch.)

some true facts which they did not know before.

In the Great War the Royal Flying Corps was an arm of the Army. Even the Independent Air Force was under the command of Marshal Foch, the Generalissimo of the Allies. The air arm of an Army has functions very different from those of an Air Force, and particularly from those of a Home Defence Air Force. The primary use of aeroplanes in a land war is to reconnoitre the enemy's positions and to photograph them. Secondary functions are to spot for the guns and to bomb the enemy's positions and lines of communications. Special aircraft are necessary for these duties, and such types are not designed for fighting, though they carry guns for their own defence. Specialised fighters came on to the scene in order to shoot down the reconnaissance machines of the enemy, and to protect their own machines from the attacks of enemy fighters. The result was combats, sometimes duels between single machines, and sometimes dog-fights between formations of fighters of both sides. The same sort of thing would probably happen in another land campaign.

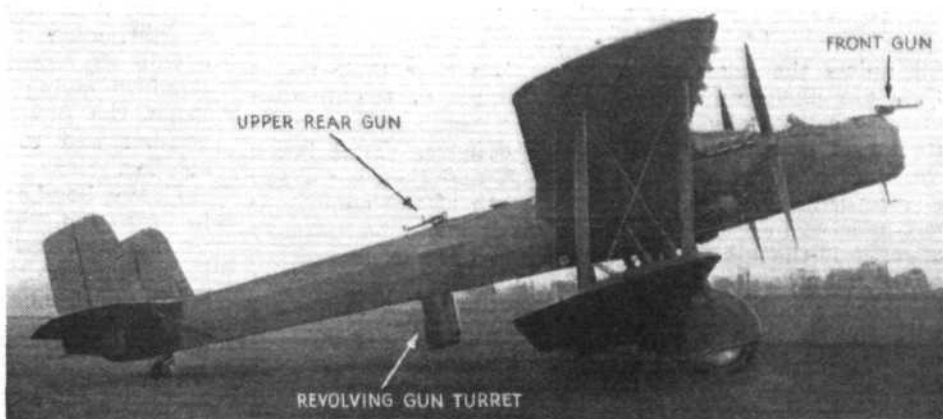
In an air defence campaign it is extremely unlikely that fighter will be opposed to fighter. The combats which are expected are between invading bombers and defending fighters. The idea of sending an escort of fighters with a formation of bombers has been discarded, partly because the best fighters do not carry as much petrol as the bombers do, and partly because the bombers are supposed to have a very good chance of holding their own in a fight. The case of fighter *versus* bomber is, therefore, the only one which will be considered in this article.

In all fighting, each side has an object. The object of the bombers is to reach a given objective and drop their bombs on it. The objective is a target of military importance, such as a munitions factory, a naval dockyard, a railway station, or an aerodrome. Usually discretion is given to the leader of the bombers to attack another objective if he cannot find the one which he is ordered to attack. He has not, however, much freedom of action. He must make for his given objective, and if he is diverted from it he has to that extent failed.

The main object of the fighters, so Air Vice-Marshal Joubert de la Ferté, A.O.C. the Fighting Area, stated in a recent interview, is to inflict casualties—to shoot the bombers down. The fighters have no lively hope of preventing them all from reaching their objectives, but if they can destroy enough of them they feel sure that raiding will soon cease. They want to stop it as quickly as possible, and so they are out for blood. A bomber shot down while on his way home gives quite as



The "Hart" light bomber has one fixed gun in front, fired by the pilot who has to aim the whole machine. The rear gun is movable and protects the zone above, that to the rear, except where masked by the tail, and over a wide arc below on each side. There is a blind spot immediately beneath the machine. (*Flight* photograph.)



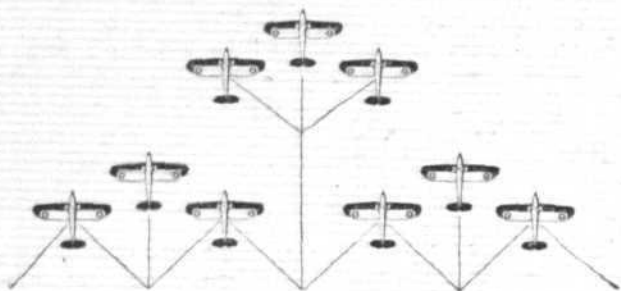
The Handley Page "Heyford" heavy bomber has one gun position in the nose, a second gun above the fuselage behind the wings, and a revolving turret which can be lowered underneath the fuselage. It would be difficult to find a blind spot. (*Flight* photograph.)



The Boulton Paul "Overstrand" medium bomber has a very efficient revolving gun turret in the nose, commanding a complete hemisphere. The gunner is also the bomb-aimer. Behind the wings are two gun positions, one for firing upwards and the other below the fuselage for firing downwards and rearwards, but there is only one gunner for these two guns. (*Flight* photograph.)

severe a shock to the morale and the strength of the enemy as if he had been destroyed before he reached his target.

At the same time it must be realised that if the fighters drive the bombers off their path, or if they force them to stop and fight, they will have scored by preventing the bombers from carrying out their allotted work. Even if the bombers are forced to "swing their tails" while in formation to throw the fighter pilots off their sights, the raid will be slowed down, and that may be of some advantage to the defence. It may give time for reinforcements of fighters to come into action. To force the bombers up to great heights, which is rather the work of the anti-aircraft artillery than of the fighters, is an advantage,



This diagram indicates how bombers in "squadron formation" would use cross-fire against an attack from the rear. No machine defends itself, but aims at a fighter which attacks its fellow.

for unless the bombers can come low over their target they are likely to miss it. Inhabitants of the invaded country cannot always realise that a bomb which misses its target is one point up to the defence. That bomb may kill civilians nearby the target, and then a tragedy is recorded. But the fighting strength of the country is not affected by such losses, whereas it might be seriously affected if the military objective had been destroyed.

The main object of the defenders, then, is to inflict casualties on the bombers. This article is not concerned with the organisation by which the fighters are enabled to intercept a raid. We will take it that the Observer Corps has reported the course of the raid, the Territorial gunners have supplemented the reports and fired at the raiders, the A.O.C. Fighting Area has sent his orders to his fighters, and that the latter have caught sight of the enemy. Different sets of conditions have now to be considered. First, we must distinguish between fighting by night and fighting by day.

On the whole, the problems of fighting by night are the simpler. No interception is to be expected unless the searchlights either catch a bomber in its beams or at least indicate its whereabouts. At night the practice is to send up single fighters on what is called standing patrol, relieving each one at regular intervals. It has also been the usual practice for night bombers to attack by single machines, one following another at intervals of about a quarter of an hour. The idea has been to avoid chances of collision in the darkness. During the recent air exercises, however, cases occurred of three night bombers flying in formation. No doubt they were trusting to their automatic pilots. It is doubtful if formation flying and the cross-fire of the rear gunners would be of much help to them if the searchlights caught one of them and the patrolling fighter flew up to attack. In the combat all the initiative lies with the fighter, and it attacks from out of the darkness. The men in the bomber which is caught by the beam are fairly completely blinded by the glare. It is unlikely in the extreme that any one of their gunners would be able to draw a bead on the fighter. An occasional glimpse of its exhaust might be caught as the fighter turned, but that glimpse would only be momentary. If the fighter pilot was a sufficiently good shot to put his bullets into a vital spot in the bomber, that bomber ought to be doomed. Moreover, it is not quite necessary that a searchlight beam should catch a bomber direct. From the ground it is sometimes possible to sight

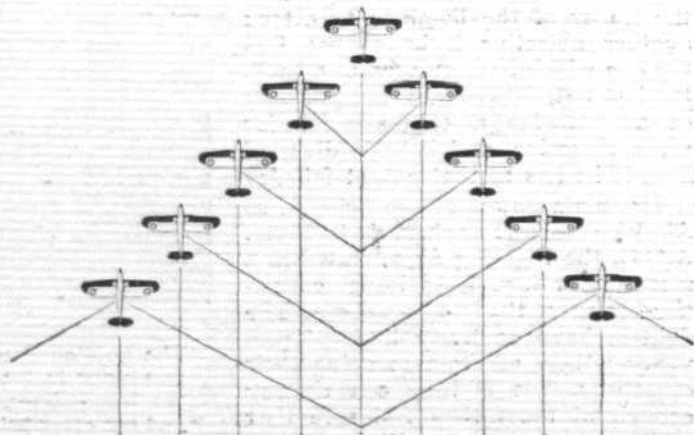
a bomber in the diffused light near a beam, and the fighter pilot would also be able to find it in such a position. If the bomber were anywhere near the beam, the fighter pilot, questing round, might sight its exhaust, and as the heavy bomber would not be doing aerobatics, this would give him a good idea of where to aim.

Low, thick clouds are the worst handicap which the night fighter can encounter. The sound-locators may know where the bomber is, and the searchlights may point at him; but if the clouds are too thick for the beams to penetrate, then the fighter is left without his essential helper. But if the bomber is to hit his target he must be able to see it, which may mean diving below the clouds. The defence then has another chance.

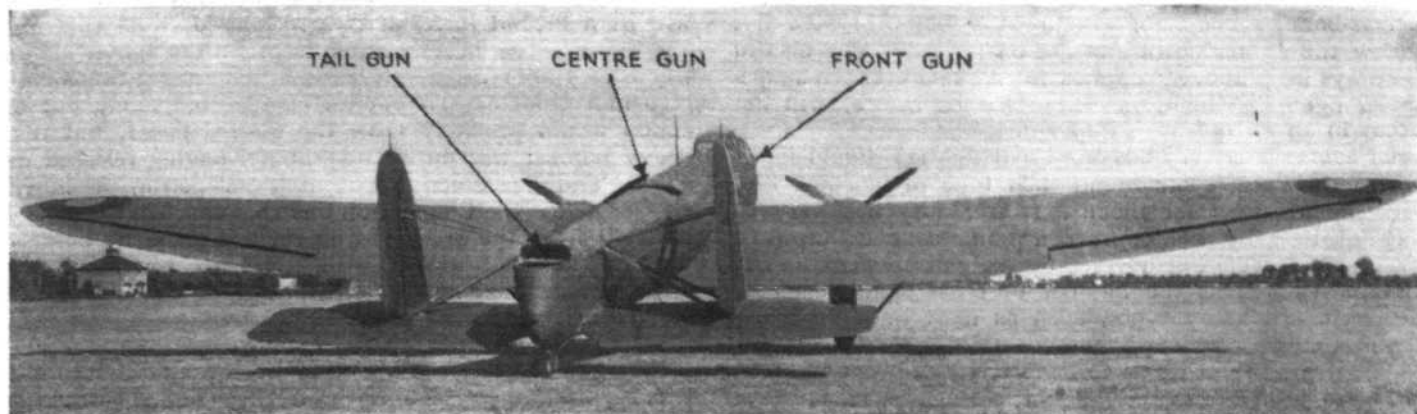
Day raids offer a much greater diversity of problems for the fighters. Bombers may come over in formation; in fact, light single-engined bombers almost invariably do so. They may come as a squadron of nine machines, either in squadron formation (a triangle of three flights) or in Squadron V; or, as was tried during the last air exercises, they may filter in by flights of three machines in succession. Medium bombers may come in formation or by single machines. An aeroplane of the type of the "Overstrand" is fairly fast, very manœuvrable, and heavily armed. As a single machine is less noticeable than a formation, it may be thought worth while to send in medium bombers singly, as, if one of them is intercepted, it is thought well able to take care of itself in a fight, even if opposed to three fighters. One of the events at recent Hendon Displays has shown medium bombers giving an infinity of trouble to three fighters. What the programme did not emphasise was that the bomber had to abandon its mission while engaged in combat.

Heavy bombers may also raid by day, either singly or in formation. They are heavily armed, but not manœuvrable or so fast as the medium bombers, and, therefore, it is more probable that they will come in formation, relying on the cross-fire of their guns for protection. They carry heavy bombs and are probably allotted important targets not easy to reach; therefore, it is even more important for them than for the medium and light bombers to hold straight on their course. If a heavy bomber is lost, it is not replaced so quickly as a light bomber can be. For all these reasons it is especially important that every raid by the heavies should be successful and should force its way through all opposition. A victory by fighters over heavy bombers is a proportionately big score for the defence. It is easy to understand that when the Germans lost ten "Gothas" or "Giants" out of about thirty-five raiders on Whit Sunday, 1918, they did not again attack London.

In each of these cases the tactics of the fighters will vary according to their own numbers and those of the



A bomber squadron in "squadron V" commands a fine field of fire to the rear. Again, cross-fire is used. The two rearmost machines are the most vulnerable.



The Fairey "Hendon" heavy bomber not only has one gun position in the nose and one behind the wings firing upwards, but also one behind the rudders which commands a complete hemisphere.

enemy. In an air defence campaign it does not seem likely that there will be any place by day for lone-hand fighters like Ball. They may develop in a land campaign, where enemy reconnaissance machines have to be destroyed, but in the air defence campaign the day fighters will usually work in formations of not less than three. They keep a loose formation, and only keep it until they come up with a raid. Then the leader gives his orders by radio-telephony for such-and-such a form of attack, and the pilots then break formation and proceed to carry out the attack which has been ordered. The form of attack selected by the leader will depend on the numbers of the fighters, whether they are single-seaters or two-seaters, on the numbers and formation of the enemy, and on the clouds and weather generally. If the raiders are just above a cloudbank, an attack from below will probably be impossible. If they are just below the clouds, it is highly unlikely that diving on them from above will be practicable.

The Engine as Shield

It must be borne in mind that fighter pilots must take risks. Their main object is to inflict casualties on the enemy and only to a lesser extent to avoid casualties among themselves. Still less must they consider saving their aeroplanes. It is quite correct for a fighter pilot to regard his engine as a shield for his body. It may be put out of action by the enemy's fire, but it is unlikely to stop completely the first time it is hit. It may still permit the fighter to shoot down his enemy. In any case, the fighter pilot has a parachute and is fighting over his own country. If his engine and aeroplane are shot to pieces he may still be in the air and fighting again the same day. He will naturally be inspired by the thought that he is defending his own homeland, and that a casualty suffered by the defenders is of far less consequence than a casualty inflicted on the enemy. In war the fighters will do various things which they must not practise in peace-time. One such manoeuvre is the head-on attack, the fighters trusting to the manoeuvrability of their machines to avoid a collision at the last moment. Usually in such an attack the fighter pilots will only have to face the fire of one gun in each enemy bomber. In the case of light bombers they will be fixed guns fired by the bomber pilot; in the case of multi-engined bombers there will be a movable gun in the nose of each. The engines and radiators will then make good targets for the fighters, for even if one bomber engine and also one fighter engine are put out of action, the defence will have had the best of it. If the bomber is forced to land, the crew will be taken prisoners.

Surprise is, if not essential, at least very desirable in every attack. Diving out of the sun is an old device which will never grow too old. Another very desirable element of attack is to have superiority of numbers. This cannot always be arranged, but the fighters when, say, a

squadron of nine attacks a squadron of nine, may give themselves a local superiority by concentrating their numbers on the rear machines of the formation. If the bombers are in V there will be two rear machines, and if in squadron formation there will be four. These rear machines will partly mask the fire of the machines in front of them. The fighters may attack the two rear bombers from behind. In this case, light bombers are considered, and the fire of the rear gunners is masked against this attack by their own empennages. If the bombers were to keep straight on their course this attack would probably be fatal to them, and their squadron would be eaten up from the tail. They will certainly fly in zig-zags to prevent the fighters taking steady aim.

Where the fighters have an absolute superiority in numbers, the enemy rear gunners may be rendered futile by simultaneous attacks from above and below. If a single light bomber gets left behind by the formation, a flight of three fighters will settle on him. Two will dive from above, one on each side, while the leader will zoom up into the blind spot under the tail. In such circumstances this form of attack should be very deadly, even though the bomber postpones the end by flying an irregular course. It is hoped that the fire of the anti-aircraft guns on the ground may often break up a formation of bombers, and so allow the fighters to apply local superiority of fire.

Two-seater fighters have more forms of attack open to them. As was demonstrated at the last Hendon Display, they may fly in front of the bombers and below them, firing up with their rear guns. The rear guns of the bombers will then be masked, and the bomber pilots can only bring their front guns to bear by putting their noses down, which will be one of the last things they want to do.

In the third volume of "The War in the Air" the official historian writes of the Bristol Fighter, a two-seater fighting aeroplane which at first had a poor reputation in France: "The mistake in tactics . . . was in the idea that the observer, or machine gunner, in the rear seat was the important firing unit, with the result that pilots, in the early encounters, continuously manoeuvred to get their rear gunners into firing position. But pilots came to realise that the offensive weapon was the front gun under their own control and in the line of their movements, and that the rear gun was protective."

These remarks apply to combats between fighter and fighter. They do not hold good when two-seater fighters attack a formation of bombers.

Fighters now avoid zooming after a close attack. A zoom slows up the machine and presents a steady target to the bomber's rear gun. Even a two-seater fighter avoids this manoeuvre because, though it has a rear gun itself, it is doubtful if the gunner would be steady enough to use it with effect in the stress of the change from dive to zoom. The fighter prefers to get clear by diving. Loss

of height is not of necessity a disadvantage in the fighter-versus-bomber combats, because the bomber must not follow the fighter down and get on its tail. The maxim "always keep above" applied to combats between single-seater fighters, which, as was explained before, will not occur in an air defence campaign.

Of course it is very desirable that fighters should know where the blind spots round each type of machine are, and should make for them. It is hardly necessary to explain that by the expression blind spot is meant a place which cannot be covered by the guns of the bomber. In modern designs the number of blind spots tends to diminish. In many types, such as most light bombers, there is still a blind area underneath. In that case it is essential for the bombers to keep formation and trust to cross fire, each rear gunner firing at the fighter who attacks his partner, and trusting to his partner to defend him. In the "Overstrand" medium bomber there is one gun position behind the wings on top of the fuselage and one below to cover the blind spot, but there is only one gunner for the two positions and he cannot fire in both directions at once. In the heavy "Heyford" a revolving gun turret can be lowered underneath the fuselage to obliterate the blind spots down there, but the empennage might still partially mask the upper guns against an attack from the rear. Other types have gun cockpits behind the rudders which give a complete hemisphere of fire. The fighter pilots need to know all about the blind spots of whatever type they have to attack. When they have the advantage of numbers, the fighters will probably rely on simultaneous attacks from different directions rather than on searching for blind spots.

It is also necessary that the fighter pilots should be well aware of the vital spots in each type of bomber. During the war many fighters adopted the principle of aiming at the pilot. Richthofen, when attacking a two-seater, usually tried to kill the observer first and then the pilot. Such tactics may still be good against light bombers. In the case of heavy bombers it may not be so easy to deprive the machine of its guidance. It may have an automatic pilot, but presumably the captain of the air-

craft would take charge when it was attacked. There will be a second pilot, and there may be dual controls. The tanks should be a desirable target, if the fighter knows where they are located. Even then self-sealing tanks may give him trouble. To put an engine completely out of action would probably have the desired effect, but if a heavy bomber was on its way home, having released its bombs and consumed about half its petrol, it might stagger across the Channel on one engine. That is to say it might have the ability to do so, but once the bomber were crippled and slowed down, the fighters would naturally redouble their attacks on it.

Weight of Fire

Four-gun fighters are about to be introduced into the R.A.F., and it seems likely that they will simplify the problem of bringing down an enemy aircraft once it has been engaged. Even a short, well-aimed burst from four guns would be calculated to produce serious results on the structure of a bomber, even if no immediately vital spot were hit. Another device is the small shell-firing cannon, but though a C.O.W. gun of this class is installed in the nose of the "Perth" flying boat, it is understood that the Air Ministry does not consider it a suitable armament for a fighter. Hits on an aeroplane are not expected at a range of over 200 yards, and many successful fighter pilots have considered 100 yards as the effective range. It is very necessary to carry as many rounds as possible on the fighter, and small arm ammunition is much lighter than the smallest shell.

In some countries there has seemed a tendency of late to subordinate all other characteristics of a fighter to sheer speed. The argument is that the fighter can do nothing unless it can catch the bomber. That is true, but in the defence of London the fighters will move on interior lines, which increases their relative speed. It is also true that a fighter which is not highly manoeuvrable is not likely to be of much use when it has caught the bomber. It is of the utmost importance that when the fighters have caught the bombers they must have the ability to shoot them down.

Commerce and Aviation

SIR PHILIP CUNLIFFE-LISTER, Secretary of State for Air, recently received a deputation from the Commercial Aviation Committee.

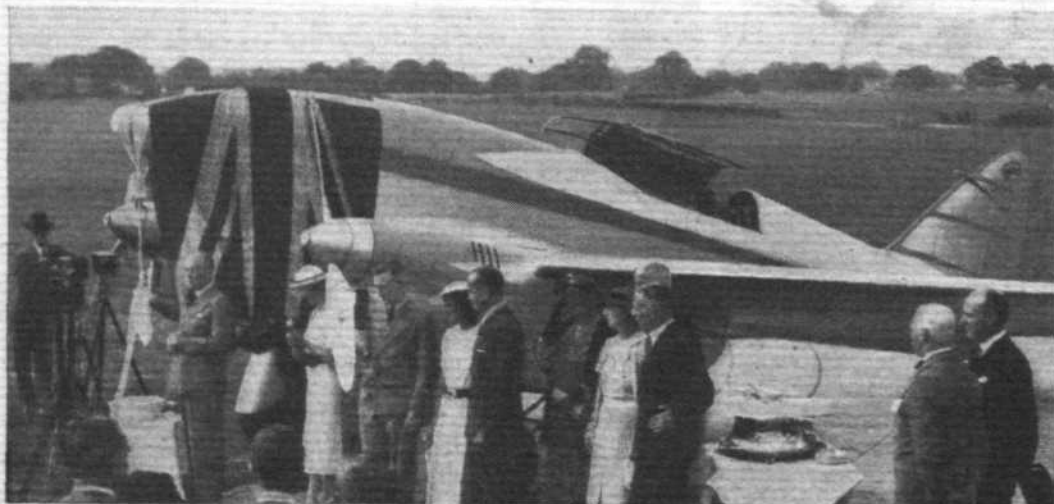
Sir Stephen Demetriadi, putting the case for the deputation-referred to the great interest of the Committee, which represented the whole of commerce and industry in this country, in the development of internal aviation.

The committee had come to the conclusion that the scheme which they had laid before Lord Londonderry last February for the establishment of an independent statutory board for planning internal airways was still the best solution.

The board would not be concerned with the ownership of aerodromes but its main functions would be the technical

development of radio and lighting equipment, the issue of specifications to secure a uniform national standard, the planning and installation of this equipment, its supervision and maintenance, the provision and control of the air traffic personnel and kindred activities. It would co-operate with local authorities, the Air Ministry and Government departments.

The Secretary of State for Air, in reply, said that he had listened with great interest to the proposals of the Committee, but after careful thought he had come to the conclusion that an independent body would not necessarily prove the best instrument for the purpose for which it was intended. He then went on to explain the objects of the newly formed Maybury Committee. This, he said, would make close contact with local authorities and other interests and he would suggest that the Committee should be invited to express its views.



BOOMERANG : Last Thursday, shortly before Mr. Campbell Black and Mr. McArthur left Hatfield in an attempt to fly to Capetown and back in record time, the "Comet" was named *Boomerang* by Lady Fielding. Seen in front of the machine are (left to right) Mr. Cyril Nicholson, who is sponsoring the flight, Lady Fielding, Mr. J. H. McArthur, Mrs. Campbell Black and Mr. I. Campbell Black. The flight was abandoned at Cairo owing to a shortage of lubricating oil. A further attempt will be made very shortly, and it is hoped to cover the 7,300-mile journey with only two stops for fuel, at Cairo and Kisumu. (Flight photograph.)

A DUNSTABLE IDYLL

or "The GRASSHOPPERS COME"

With Apologies to DAVID GARNETT

HOW very much pleasanter aerodromes would be if there were no noisy aero engines to disturb the peace. Who has not thought something like that every time they have visited an aerodrome? After all, flying—that is, flying naturally like the birds do—is a peaceful proceeding. It is noiseless, graceful and beautiful. The only trouble is that an aeroplane wants a horrible contraption enclosing millions of explosions before it can be got into the air. Not so the glider or sailplane. With them there is peace, and when the conditions are good hours can be spent up in the air soaring about for all the world like a bird, taking advantage of the movements in the air itself and really flying instead of being dragged through the air by a disturber of the peace.

For the past fortnight nearly sixty people, women and men, young and old, have been under canvas, and very comfortable, too, at Dunstable, where the London Gliding Club has organised its summer gliding camp. The keenness to be seen there is simply amazing. It doesn't matter

what has to be done, hauling on the "bunjee" (rubber rope for launching the gliders), or any other heavy work, everyone jumps to it and likes it—what could be more conducive to health and energy than fourteen days of fresh air and Mrs. Turvey's food at Dunstable?

Of course, a camp like this, where instruction has to be given to a varied collection of people, some of whom have never done any gliding and some of whom think they know all there is to know, is very dependent indeed for its success on its instructors. The club suffered a severe loss when Mr. G. E. Collins was killed recently, and for a time it almost looked as if the *impasse* would prove insurmountable, but Mr. S. Humphries stepped into the breach, and the success of his tactful and hard-working efforts can be measured by the fact that even by last Sunday 30 "A" licences had been obtained, with 21 "Bs" and 1 "C" to back them up.

Conditions have not, on the whole, been very good. The winds have been light and of practically no help at



1



2

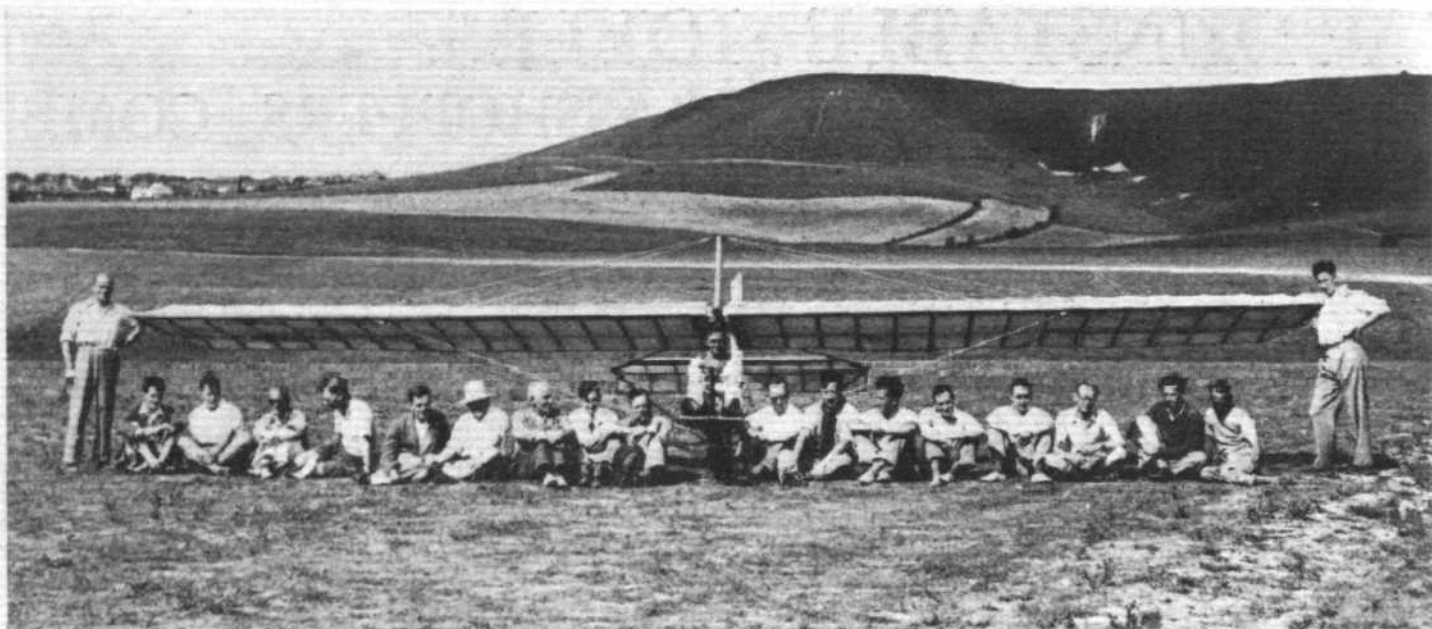


3



4

1. A "Dagling" primary trainer which the London Gliding Club has made more efficient by fitting a nacelle around the pilot. 2. Mr. J. P. Dewsbury soaring over Totternhoe in a Kassel two-seater. 3. Mr. C. Nicholson piloting the "Rhon Buzzard" an efficient German-built sailplane. 4. A member of the Summer Camp making a "ground-hop" in a "Dagling."



One of the several instructional groups, into which the members of the Summer camp at Dunstable have been divided, seated in front of their primary trainer.

all for those who wished to do any soaring proper. However, ground-hops have gone ahead intensively, with the result that practically all of the 30-odd beginners have been sent off the top of the Downs in one or other of the primary machines. Perhaps before this appears in print there will be a good breeze straight on to the ridge, and then "Professors," "Wrens," and other sailplanes will be given their chance, and soon the hours will be piled up. Dunstable is a good site for soaring; direct up-currents from the face of the hill can easily be found, and without going very far afield there are thermal currents with the help of which cross-country flights can be made.

For the more skilful there is always the possibility of "hooking on" below large cumulus clouds and getting altitude enough to glide to the next cloud, and make away cross-country in that fashion. Whipsnade is quite close, too, and sometimes a forced landing in the lions' pen seems almost a certainty, but so far there is no record of anyone having actually had to do it. Funny things do, however, happen there. For example, Major Petre was recently soaring his machine in the vicinity when he saw a large red and blue kite getting near him—he was at 250ft. at the time—so he began to get hot and bothered looking for the string so as to be able to avoid it. Probably he was too startled to be relieved when he found that

there wasn't any string, because the kite was a parrot!

Even apart from the camp Dunstable is worth a visit—there is quite a lot of flying during the week as well as week-ends. The new hangar-cum-clubhouse is going up fast, and when finished will be very much better designed than many an airport building. The number of machines housed there even now is astonishing, and that alone shows the growth of this sport since it was started again some five years ago. All those machines are not just club machines either, because there are quite a large number of small groups of members who have bought sailplanes for themselves, each group looking after its own machine and trying to outdo other groups in feats of soaring. Apart from these, there are also a considerable number of machines owned by single pilots who spend every moment of their spare time out at Dunstable searching for "uplifts."

The response to this year's camp has been a veritable and severe jolt for those who have maintained that the days of gliding are over. Actually, the club authorities have turned away far more people than they have been able to accept, but they wisely set their faces against taking on such a large number that there would be difficulty in giving everyone adequate instruction during the fourteen days during which it is being held.

C. N. C.

A New British Sailplane

NAMED the "Hjordis," after a mythical young woman of great beauty, Norse origin and a pair of wings, a new sailplane, which has been built to the designs of Flt. Lt. G. M. Buxton, has recently been flown at Sutton Bank. The "Hjordis" has considerably greater wing loading (4 lb./sq. ft.) than is usual in sailplanes, but although the span is only 51 ft. the aspect ratio is unusually large, as the average cord is only about 2 ft.

This new machine was built by Mr. Frederick Slingsby at Kirby Moorside, and is so designed that it is very compact when dismantled and packed in a trailer suitable for towing behind a motor car. Although the gliding angle is very flat the speed is high, between 30 and 55 m.p.h. These characteristics are particularly valuable for cross-country flights, as the time spent, and therefore the height lost, in getting from one area of lift to another is very small. The wing is carried somewhat unusually high above the fuselage on a streamline structure which also forms an enclosed cabin around the pilot. This space is comparatively large, and allows the pilot to

turn his head and look behind and to the side of him, where transparent panels give him an excellent outlook.

For "Pou" Enthusiasts

THOSE who have been "bitten" by the "Pou-du-Ciel," but who do not wish to manufacture all components themselves, will be interested to hear that another firm now entering the field is E. G. Perman and Co., at 24-26, Brownlow Mews, Guilford Street, Gray's Inn Road, London, W.C.1, who are offering not only complete air frames, wings and fuselages, but smaller parts. They also cut, plane and number the wood for those without the facilities or inclination to do these jobs.

The company has two "Pou" under construction at present. They are standardising on the new Scott engine, which gives a maximum of 34 h.p. at 5,200 r.p.m. and weighs 85lb. It is their intention to employ West Virginia spruce, which appears to give complete satisfaction, for their future "Pou." Wheels will be of the Dunlop "wheelbarrow" type with aluminium hubs.

SOME PAN-AMERICAN FIGURES

An Investigation of the U.S. Foreign Air Mail Contracts

STATISTICS are probably the most abused form of information in the world. Figures can be made to prove anything, and figures relating to the operations of two concerns can never be compared unless the whole operations are themselves analysed in the most complete detail.

Few statistics in aviation are more sought after than those relating to the amount of money paid by Governments to their respective subsidised air lines. In this country the total amounts paid to Imperial Airways are in the form of lump sums paid by our own Government and the Governments of the Dominions and Colonies. This, compared with the amount received by the foreign air lines, is an extremely small figure. For example, for the year 1934 the sum was £544,806 12s. 11d., of which £146,000 was contributed by the Dominions and Colonies.

For the same period the mileage flown was 2,483,038, the passenger-miles 22,402,481, the ton-miles of mails 662,535, the ton-miles of freight 378,302, and the ton-miles of passengers 2,100,148.

Calculation will show that the amount of the subsidy per mile over the total mileage is only 4s. 4.5d.

Compare that with the 8s. 2d. per mile which Pan-American receives for the greater proportion of its routes as payment for carrying air mail! In America there is no direct subsidy in so far as cash is concerned. The payment for carriage of air mail is virtually a hidden subsidy, but is, nevertheless, a very large subsidy. The American domestic (or internal) air lines, and, to a lesser extent, Pan-American Airways, also have considerable help from the Government in the nature of radio, teleprinter and meteorological services.

For that and other similar reasons it is both invidious and profitless to lay too much stress on a comparison between various air lines.

Placing Contracts

However, as we have already pointed out in previous articles, there is a reasonable measure of basis for comparison between Pan-American Airways and our own company, Imperial Airways. They both run over numerous different countries; both have to cope with difficulties over currencies, national systems of communication, and widespread air systems generally. Pan-American, however, has one advantage in that Spanish, in addition to English (or should I say American?), suffices for their whole system, while Imperial Airways has to cope with many different languages. It will, perhaps, therefore be of some considerable interest to quote in some detail passages from a résumé, which has been issued by the Directorate of Civil Aviation, of the "Senate Committee Print, Part 3, including the letter from the U.S. Postmaster-General to the Chairman of the Special Committee to investigate air mail and ocean mail contracts."

This document is a striking indictment of the method by which contracts have been awarded. However, notwithstanding the contention of the report that Pan-American Airways has been shown favouritism by former officials of the Post Office, we doubt if anyone will worry over much about the actual method of awarding the contracts.

The findings of the Federal Aviation Commission were to the effect that the placing of contracts by competitive bidding was basically unsound, and that is the general feeling. That the Post Office officials also thought so is shown by this present document. Whether or not theirs was the best way to overcome a law generally conceded to be absurd is not for us to say. Obviously it would not be in the interest of the American Government to have

several small companies on their subsidy pay-roll carrying air mail to Latin America with varying degrees of efficiency. They have apparently come to the conclusion that Pan-American Airways is a valuable asset to the country. No one will deny that point of view. South America is encircled by this vast air way system, and America naturally reaps the trade benefit.

It has, of course, never been admitted, but would also seem to be the same case in this country, where the Government have backed Imperial Airways from the first and do not show any particular desire to help any other companies to start up in the same line of business.

Operating Costs

So much for the award of contracts. When we turn to expenses and payments this document becomes really very interesting. It lays bare the fact that, according to Pan-American reports, their New York office cost £25,383 during August, 1934, and £134,967 between January 1, 1934, and August 31, 1934; moreover, during that year this vast amount was all charged to the expenses of the Caribbean division, which, as previously explained, covers the operations from Miami, through the West Indies, to Belem (Para), Cristóbal (Panama), and Merida (Yucatan). The apparent reason for this is that 90 per cent. of all the air mail transport miles flown by the company in this division are air mail contract operations at maximum rates allowed by law (8s. 2d. per mile). The result is that the direct operating expense of the division was increased by 3s. 9d. per mile during August, 1934, and 2s. 4d. per mile during the eight months ending October 31, 1934.

Operating costs are one of the most interesting items of some one else's air line! Quite a considerable portion of this report deals with this vital subject. The following table gives the average direct flying costs of the different types of aircraft used on the Caribbean division. The figures are derived from data supplied by Pan American Airways and are based on a study of the total miles flown for the period January 1, 1934, to August 31, 1934. These figures, it is pointed out in the report, are very considerably less than the indirect costs per mile, although a study of the domestic air line operations shows that the total indirect costs of operation do not exceed the total direct flying costs, and the investigation did not show any reason why the indirect costs of the foreign air mail routes in question should be so much greater than the direct flying costs.

Aircraft.	Average miles per hour.	Average direct flying cost per mile.
S-28 (amphibians), (9 pass.)	96.2	1s. 10d.
S-40 (Clippers), (38 pass.)	107.9	4s. 1d.
S-41 (12 pass.)	106.0	2s. 8d.
S-42 (Superclipper), (test only) (32 pass.)	144.4	2s. 10d.
Commodore (22 pass.)	100.9	2s. 2d.
Average all types	100.7	2s. 6d.

In a later discussion of the flying costs it is stated that "contrary to what appears to be the prevailing opinion, the new, modern, and larger equipment now being used costs less per mile to operate than the equipment which it is superseding. This reduction in cost is attributable mainly to the increase in cruising speed. For example the Super Clipper (Sikorsky S 42) has a cruising speed one-third greater than the Clipper and costs one-third less per mile to operate. The expenses for the crew, radio, motors, and many other items are the same for both types of Clipper."

That statement would seem to need some explanation. In the first place, the Sikorsky S 40—the Clipper—is adver-

tised to carry 38 passengers (sometimes called 40) whereas the S 42 only carries 32. Furthermore, it cannot seriously be meant that the radio and motor costs are the same, because those of the S 42 are in each case of very much later and more modern design than those in the S 40. The airscrews in the S 42 are of controllable pitch (and will later be the constant speed type), while those in the S 40 are of fixed pitch. A true comparison of the costs per mile of any aircraft cannot be made unless the number of passengers each can carry is taken into account.

There is also reference to the costs, on the domestic lines (although there cannot be any true comparison between the Pan-American and domestic lines) of the Douglas and Ford aircraft. The former is quoted as 11½d. per mile and the latter 1s. 2½d. per mile.

Figures showing the increase in passenger business are given for the years 1929 to 1933 inclusive and are instructive in the story they tell of steady development. The express (or freight as we call it) carried has also grown very considerably, showing an increase of 80 per cent. in volume from 1932 to 1933. It is safe to say that that increase has steadily grown since that time, as in August 1, 1934, the Pan-American Express Agency Inc. was formed and affiliated with the Railway Express Agency, a concern which has 29,000 express offices.

Year.	International airways mileage.	International passenger miles flown.	Passenger miles per route mile.
1929	12,265	5,360,000	437,016
1930	17,861	8,980,000	502,771
1931	20,664	12,479,000	603,901
1932	26,652	19,571,000	734,316
1933 *	30,982	27,511,000	887,067

Pan American Airways, Inc., holds the following contracts with the United States Government for the transportation of mail by aircraft, known as foreign air-mail routes: No. 5, between Miami, Fla., and Cristobal, Canal Zone, and return; No. 5 extension, Cristobal, Canal Zone, to Paramaribo, Dutch Guiana, and return; No. 6, between Miami, Fla., and San Juan, P.R. and return; No. 6 extension, San Juan, P.R., to Port of Spain, Trinidad, and return; No. 7, between Miami, Fla., and Nassau; No. 8, between Brownsville, Tex., and San Salvador, and return and Brownsville, Tex., and Mexico City and return; No. 10, between Paramaribo, Dutch Guiana, Santos, Brazil, and Buenos Aires, Argentina, and return.

Pan American Grace Airways, Inc., holds route No. 9

from Cristobal (Canal Zone) south along the west coast of South America to Santiago (Chili), east over the Andes to Montevideo (Uruguay) via Buenos Aires (Argentina).

The following extract from the report summarises the feeling of the Post Office at the present time and explains why certain modifications are being suggested both in the services and in the amount to be paid for them:—

"It is my opinion that an air-line system in the countries now being served by the contracts under consideration is very valuable to the United States in the establishment of closer and more friendly relations with the Latin-American countries, and that their continued operation will prove of inestimable value to those countries as well as the United States. This view is undoubtedly shared by Congress, as shown by its continued appropriations for this purpose. However, these appropriations must be considered, for the greater part, in the nature of subsidies granted for the purpose of aiding the contractors to meet their expenses and continue to operate until such time as they are self-sustaining. I do not believe that subsidies should be granted for the purpose of enabling the contractors to make unreasonable profits. Indeed, private investors who put their money in such enterprises should be well satisfied if the Government furnishes sufficient aid to protect them against loss through the pioneering stages. This has been done in this case, and the total sum of \$35,733,656.07 (£7,343,537) has been paid up to December 31, 1934, for the purpose of continuance of this service."

ANNUAL SAVINGS UNDER PROPOSED SERVICE AND RATES

Foreign air mail routes	Payment under present service and rates.	Payment under proposed service and rates.
5	\$2,237,456.00 (£459,814)	\$465,036.00 (£95,568)
6	\$891,904.00 (£183,303)	\$1,349,392.20 (£277,310)
7	\$40,300.00 (£8,282)	—
8	\$1,082,052.00 (£222,555)	\$1,141,062.00 (£234,497)
9	\$1,609,410.40 (£330,745)	\$1,182,129.00 (£242,936)
10	\$906,141.60 (£186,219)	\$545,875.20 (£112,181)
Total	\$6,768,164.00 (£1,390,909)	\$4,683,494.40 (£962,493)

Other Statistics

The following tables are but a small selection of the many included as an appendix to the report and probably form the first series of full operating costs based on operators own data which has been published.

STATEMENT FOR AUGUST, 1934, OF THE CARIBBEAN DIVISION OF PAN AMERICAN AIRWAYS

REVENUES.	Per Mile.	Caribbean Division.	EXPENSES—Cont.	Per Mile.	Caribbean Division.	EXPENSES—(Cont)	Per Mile.	Caribbean Division.
	s. d.	£		s. d.	£		s. d.	£
United States mail, gross revenue	*7 5	49,820	Supplies and sundries:			Fuel:		
Foreign mail	9	4,982	Divisional	6½	3,777	Gasoline	10	5,519
Less U.S. Post Office deduction	†4	2,351	Airport	6½	3,671	Oil	½	397
Net	1 2½	2,631	Total	1 1	7,448	Total	10½	5,916
Total Mail	7 9½	52,450				Total direct costs	4 9	31,860
Passengers	2 1½	14,209	Equipment maintenance:			Indirect expenses:		
Special flights	2	1,134	Motors	2½	1,454	Self-insurance reserve	4	2,239
Baggage	1½	807	Airplanes	5½	3,119	Loss and damage	½	246
Express	½	237	Shop equipment	—	139	Total	4½	2,485
Total	2 5½	16,408	Radio, meteorological	—	95	Depreciation:		
Interest received	—	7	Auto-launches	½	213	Airplanes	6	3,399
Miscellaneous	½	313	Miscellaneous	—	21	Motors	3	1,673
Total	10 3½	320	Total	9	5,041	Ground equipment	2½	1,290
GRAND TOTAL REVENUE	10 3½	69,177				Airports, hangars, stations	3½	1,909
EXPENSES.			Airport maintenance:			Total	1 3	8,271
Direct expenses:			Hangars and shops	—	90	GRAND TOTAL OPERATING EXPENSES	6 4	42,626
Divisional salaries	7½	4,222	Stations and utilities	—	83	Net Revenue from operations	3 11½	26,552
Airport salaries	9	5,035	Airport improvements	—	101	Taxes assignable to operations	1	7,830
Flying salaries	8	4,582	Ramps, barges	—	170	Net Income	2 10½	£25,915
Transfers	†1½	714	Total	½	335			
Total	1 11½	13,128	Total maintenance	9½	5,376			

NOTES: Revenue miles flown were 136,180.50. Totals are to the nearest ½d. converted from dollars. * Amount represents the gross payments to the operator divided by total revenue miles flown and is not the contract rate per mile. † Indicates deficit or reverse item.

MILEAGE FLOWN BY PAN AMERICAN AIRWAYS, INC. AND AFFILIATES.

	August, 1934.		August, 1934.
	Miles.		Miles.
Pan American Airways, Inc., Caribbean division:		Extra service:	
Foreign Air Mail, No. 5	78,842	Talara, Peru-Araquipa, Peru	1
Foreign Air Mail, No. 6	38,213	Santiago, Chile-Montevideo, Uruguay	5,540
Foreign Air Mail, No. 7	3,384	Charter: Lima, Peru-Cuzco, Peru	7,732
Foreign Air Mail, No. 10	7,384.5	Special flights	7,901.5
Tampa, Fla.-Havana, Cuba	2,970		20,443
Kingston, Jamaica-Santo Domingo, Haiti	5,387	Total pay miles	117,536
Total pay miles	136,186.5	Non-pay miles	9,321
Non-pay miles	26,458.5	Total miles flown	126,857
Total miles flown	162,639		
Pan American Airways, Inc., Brownsville zone:		Aerovias Centrales, South America:	
Foreign Air Mail, No. 5	21,323	Total pay miles	98,932
Foreign Air Mail, No. 8	24,590.5	Non-pay miles	9,236
Guatemala, Guatemala-Cristobal, Canal Zone	10,242	Total miles flown	108,168
Porto Darios, Guatemala-Teja, Honduras	584		
Merida, Mexico-San Salvador, El Salvador	442	Uraba, Medellin and Central Airways, Inc.:	
Servicios Aereos de Guatemala, South America	2,102	Total pay miles	7,488
Total pay miles	59,283.5	Non-pay miles	708
Non-pay miles	2,855	Total miles flown	8,196
Total miles flown	62,138.5		
Compania Mexicana de Aviacion, South America:		Pacific American Airways Co.:	
Foreign Air Mail, No. 8	21,802	Total pay miles	None
Mexico City, Mexico-Merida, Mexico	38,988	Non-pay miles	50
Tampico, Mexico-Tuxpan, Mexico-Poza Rica, Mexico	1,056	Total miles flown	50
Tampico, Mexico-Vera Cruz, Mexico	9,285		
Special flights	5,695	Compania Nacional Cubana de Aviacion, South America:	
Total pay miles	76,826	Total pay miles	38,803
Non-pay miles	1,213	Non-pay miles	1,075
Total miles flown	78,039	Total miles flown	39,878
Panair do Brazil, South America:			
Foreign Air Mail, No. 10	35,447.5	Pacific Alaska Airways, Inc.:	
Extra service: Para, Brazil-Rio de Janeiro, Brazil	23,087	Total pay miles	9,895
Para, Brazil-Manaos, Brazil	9,375	Non-pay miles	5,586
Total pay miles	67,909.5	Total miles flown	15,481
Non-pay miles	493		
Total miles flown	68,402.5	All companies:	
Pan American-Grace Airways, Inc.:		Total miles flown on foreign air-mail flights	306,906
Foreign Air Mail, No. 9	75,019.5	Total miles flown on other pay flights	305,947.5
		Total pay miles	612,853.5
		Total non-pay miles	56,995.5
		Total miles flown	669,849.0

PAN AMERICAN AIRWAYS SYSTEM—PAN AMERICAN AIRWAYS CORPORATION (HOLDING COMPANY)—SCHEDULE OF COMPANIES ORGANISED, COMPANIES ACQUIRED.

	Percentage of ownership.	Date organised.		Percentage of ownership.	Date organised.
(A) COMPANIES ORGANISED.					
Pan American Airways, Inc.	100	Mar. 8, 1927	Pan American Manufacturing and Supply Corporation	100	Dec. 2, 1931
Aviation Corporation of America	—	June 2, 1927	Aerovias Centrales, S.A.	100	Feb. 1932
Buffalo Airlines, Inc.	—	June 2, 1927	Pacific Alaska Airways, Inc.	100	June 8, 1932
Southeastern Airlines, Inc.	—	July 1, 1927	Pan American Executive Association	100	July 12, 1932
New York Airways, Inc.	—	July 8, 1927	Servicios Aereos de Guatemala, S.A.	100	June 21, 1933
Atlantic Gulf and Caribbean Airways, Inc.	—	Oct. 11, 1927	Pacific American Airways Co.	100	Jan. 16, 1933
Pan American Airways Corporation	—	June 23, 1928	Marine Airport Corporation	100	July 6, 1933
Peruvian Airways Corporation	50	Sept. 4, 1928	(B) COMPANIES ACQUIRED.		
Chilean Airways Corporation	50	Dec. 21, 1928	West Indian Aerial Express Corporation	100	Dec. 18, 1928
Pan American-Grace Airways, Inc.	50	Jan. 25, 1929	New York, Rio and Buenos Aires Line, Inc.	100	Sept. 15, 1930
Pan American Airways of Texas, Inc.	100	July 8, 1929	Panair do Brazil	100	Sept. 15, 1930
Pan American Aviation Supply Corporation	100	Dec. 23, 1929	Compania Mexicana de Aviacion, S.A.	100	Jan. 23, 1929
Miami-Marine Airports, Inc.	50	May 1930	Sociedad Colombo-Alemana de Transportes Aereos	84.42	Dec. 31, 1930
Pan American Imperial Airways Co.	100	May 14, 1930	Compania Nacional Cubana de Aviacion	100	May 6, 1932
Pan American-Atlantic Airways, Inc.	100	Apr. 23, 1930	China Airways Federal, Inc., U.S.A.	100	Mar. 31, 1933
Pan American Airways Co.	100	July 13, 1931	Alaskan Airways, Inc.	100	May 31, 1932
Uraba, Medellin and Central Airways, Inc.	100	Aug. 24, 1931	Pacific International Airways of Alaska	100	Oct. 1, 1932
Compania de Aviacion Pan American de Argentina, S.A.	100	Oct. 1931	Sociedad Anonima Colombo-Amer. de	70	Sept. 11, 1929

Sweden Goes Ahead

THE report, just published, of the Swedish Air Transport Company shows continuous progress in the amount of freight and mails transported in distance flown and in the number of passengers carried. Letters carried by the Swedish machines increased in weight from 81,875 kg. in 1933 to 118,702 kg. in 1934, and freight and baggage from 182,112 to 274,213 kg. In 1934 the number of passengers carried was 18,072 compared with 10,056 in 1933. The number of kilometres flown increased from 589,535 in 1933 to 898,562.

The percentage of State subsidy to income dropped from 31 in 1933 to 24 in 1934, and it is claimed that the Swedish company has a lower percentage of subsidy than any other civil flying concern in Europe.

In addition to ensuring air communication between Sweden and the rest of Europe, the company runs several services in Sweden itself, including those to the island of Gotland and from Stockholm to the castles of Skokloster and Gripsholm.

The company will shortly have available a land aerodrome at Stockholm, and it is expected that this will give a great impetus to its activities. The head of the company, Captain Florman, has stated in an interview that he expects that, in a couple of years, the distance flown annually by the Swedish air transport machines will have increased to three million kilometres.

Baghdad Bustle

ON a recent early morning Baghdad Airport appeared as busy as many European airports. During the day the K.L.M. eastbound was scheduled to leave at 3 a.m. with four passengers, the Air France local service with seven passengers, and the Air France westbound with six passengers, four of whom were for Damascus. Imperial Airways westbound service was scheduled to leave at 5 a.m. with eleven passengers. The hall was crowded with people who came to see their friends off, and all waited to see the Imperial machine depart.

A "FLYING SQUIRREL"

*First Details of New Scott Two-stroke Engine : An Inverted and Geared Air-cooled :
Maximum Power, 34 b.h.p. at 5,200 r.p.m. : Weight 85 lb.*

DESIGNED specifically for use in very light aircraft, such as the "Pou-du-Ciel" and other types, the new "Flying Squirrel" produced by the Scott Motor Cycle Company, of Shipley, Yorks, is an inverted air-cooled two-stroke two-cylinder engine. It was natural that this firm should decide on the two-stroke type of engine, of which they have had almost unrivalled experience.

Specification

Cylinders.—The cylinders are of light alloy with encast chromidium liners. Special attention has been given to the finning and graduation of wall thickness in order that distortion may be avoided and an even cooling effect obtained. The ends of the cylinder skirts project into specially shaped recesses in the crank case, and provision has been made for oil drainage, obviating any danger of flooding the pistons.

Cylinder Heads are detachable, each being secured to the barrel by six high-tensile steel studs, three of which extend from the crank case. The heads are cast in light alloy and are provided with ample finning in the direction of air flow.

Cooling.—The finning of the heads and cylinders has been so arranged that, with the ample area provided, effective cooling is a straightforward matter on any aircraft.

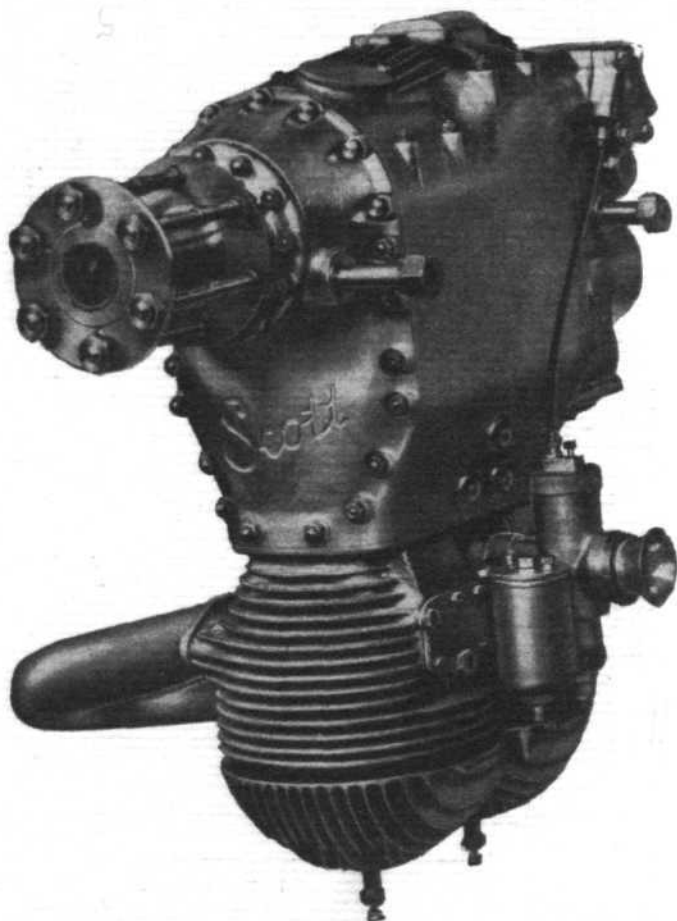
Pistons.—These are in die-cast alloy with Scott patented arrangement of skirt, and gudgeon-pin fastening. This arrangement ensures that the area around the gudgeon-pin boss has a greater clearance than the rest of the piston. Three gas rings are fitted, but no scrapers. Scraper grooves are provided which effectively control the oil distribution.

Connecting Rods.—These are of nickel chrome steel forgings, the big-end carrying a large triple-row roller bearing, which provides for the use of high-tensile light alloy cage. The big-end eye of the connecting rod is finned to provide greater heat transfer.

Crankshaft is of "Scott" patented built-up type, two sections being employed, each machined from a solid forging of heat-treated alloy steel. The main bearings, of which there are two, are of the single-row roller type.

Crank Case.—The crank case is of three sections, cast in light alloy, secured together sandwichwise, the lower joint of the sandwich accommodating the crankshaft assembly, the top section providing the bearing and housing for the propeller shaft and reduction gear.

Reduction Gear is of the straight spur type, having a ratio of two to one. The feature of the reduction gear is that the driving pinion is mounted between the two crankshaft sections, and not at the end. This reduces the loading on the cranks and bearings. The reduction wheel, which is splined to the propeller shaft, is machined from solid forging, and the shaft and its gear are dynamically balanced. Lubrication of the reduction gear is by high-pressure oil spray.



Propeller Shaft is of nickel-chrome molybdenum steel, tubular in section, and is carried in a roller bearing at the gear end, and a deep groove ball race at the hub end. This race is also arranged to take the propeller thrust.

Aircrew Hub.—This is to B.S. "O" Specification, with a slight modification in the splining of the front plate to the hub extension.

Magneto.—A standard type of two-spark magneto is fitted, running at engine speed. The drive is taken from an extension of the propeller shaft.

Carburettor.—A standard Amal carburettor in light alloy is fitted.

Lubrication is the patented "Scott" stepped-pressure system. The step-up pump takes oil from the main supply. The oil is then metered by the pump and passed under high pressure to the following points: main bearings, big-ends, cylinder walls. A separate lead is taken off this pump for the pressure oil spray to the reduction gear. The major control, i.e., maximum delivery of this pump is controlled externally, a graduated dial being provided for this purpose. A further control to the pump is inter-connected with the throttle. The object of this control is to vary the mounting of oil to the points mentioned above from zero to the predetermined maximum given by the dial settings; thus the oil is proportional to load and revs. Two scavenge pumps are used in connection with this system, one to scavenge the crank chambers, the second pump drawing oil from the reduction gear casing and returning it to the engine sump. The sump is formed around the outside of the lower half of the crank chambers, the filler orifice being located in a forward top position of the reduction gear cover.

Rev Counter Drive is picked up from the propeller-shaft and runs at half engine speed in the case of a two to one prop. reduction.

Mounting.—Four trunnion stubs are provided for mounting the engine.

SCOTT "FLYING SQUIRREL" DATA

Direction of Rotation of Aircrew.	Anti-clock.
Bore.	73 mm.
Stroke.	78 mm.
Swept volume.	652 c.c.s.
Compression ratio.	6.8:1.
Normal b.h.p.	16.
Normal r.p.m.	2,800.
Maximum b.h.p.	34 at 5,200 r.p.m.
Weight complete.	85 lb. ± 5 lb.
Fuel consumption at normal r.p.m.	0.56 lb./b.h.p./hr.
Oil consumption.	0.03 lb./b.h.p./hr.
Oil pressure.	30 to 40 lb. per sq. in.
Oil in circulation.	0.5 gallons.
Length over spinner.	600 mm. (23½ in.) approx.
Height overall.	575 mm. (22½ in.) approx.
Greatest width.	270 mm. (10½ in.) approx.

THIS RUDDER-BAR BUSINESS

An Old Hand, a Little Shocked at the Simplicity of Flying the Latest Light Aeroplane, Muses on an Instructional Ordeal of Eighteen Years Ago

IN the new "Hornet Moth," we are told, the instructor sits side by side with his pupil in an enclosed cabin, and the pilot is able to take off, normally manoeuvre, and land, all without touching the rudder bar.

Imagine for a moment the scene inside one of these luxurious little class-rooms of the air. We are at a height of about 2,000ft., and you have just made the trifling mistake of shifting slightly the position of your right foot in the middle of a beautiful 45-degree bank to port. You are tapped lightly on the knee by the sartorially perfect young gentleman at your side, who observes in quite an ordinary conversational tone of voice that one never uses the rudder bar in any circumstances, and that he really doesn't know what the beastly things are put there for. The pair of you laugh heartily, and your flying instruction proceeds on much the same lines and with about the same degree of excitement as a game of chess.

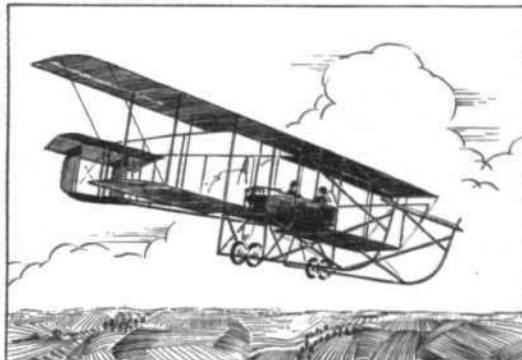
Pupil's Perch

To those of us who took our early training perched up in the birdcage-like structure of the ancient Maurice Farman, this sort of thing would seem very strange. Helmeted, goggled and leather-jacketed, with a more or less red-hot engine complete with reduction gear and airscrew immediately in the rear of us, and an extremely vociferous and gesticulating flight lieutenant immediately in front of us, our flying instruction was crude but impressive.

Let us compare the procedure when the same little error with the rudder bar was committed at a similar height in the open nacelle of a Maurice Farman biplane in the early part of the year 1917.

A terrific gale appears to have suddenly sprung up from some point on the port side, and the inert figure in the front seat stiffens slightly. The right rudder pedal comes up to meet you with surprising alacrity, almost throwing you overboard. The roar and clatter of the old Renault suddenly dies away to a spasmodic fit of coughing, and the front elevator goes down at a sickening angle.

The inert figure in the front seat ceases to be inert, performs a three-quarters right turn with great precision, and you notice for the first time the extreme redness of face of your flight lieutenant. The extraordinary protuberance of the eyeballs is another feature which has hitherto escaped



your notice. The mouth is opening and shutting in rapid succession, but as the old Renault has just been taken with another coughing fit it is quite impossible to hear a single word. It seems a bit ridiculous to say "Beg pardon?" so you shout at the top of your voice "Eh?" The hitherto three-quarters right turn is now stretched a couple of points, and you get the full-face effect, which to your horror is starting to turn blue. The mouth forms two words—just two, no more and no less—and you suddenly discover

how clever you are at lip-reading.

Then, to your intense relief, the blue face is replaced by the back of the flying helmet, the Renault emits a final cough and springs back to life, the front elevator exchanges its background of red roofs and green fields for blue sky again, and as by this time all control has been rudely snatched away from you, you sit back and enjoy the scenery. The aerodrome is directly ahead and below, and then the Renault is suddenly faded out completely. Down goes the nose, and you notice the aerodrome landing tee about level with the top of your front elevator. The figure in front of you rests its elbows nonchalantly on the sides of the nacelle, and you are mildly surprised to find yourself holding the controls in a gentle but very-firm grip.

Back to Earth

The landing tee grows steadily larger, and you find yourself thinking of good old So-and-so who flattened out too soon, pancaked, and was known thereafter as "the man who put a dihedral in the Maurice." And of poor old So-and-so who flattened out too late . . . and you ease the controls gently back towards your chest. This seems to be about the correct height for holding-off, and you are waiting for the wheels to touch down when you notice to your great astonishment that the old contraption is just coming to a complete standstill without a sign of that peculiar mixture of bump and rattle so characteristic of your previous landings. The figure in the front seat again executes that three-quarters right turn, and you are relieved to observe that the face has resumed its natural colour once more. The eyes have a more normal look about them, too, and the teeth are visible in a broad grin. "Fine landing," says he, scrambling over the side. "How about a nice cup o' tea?"

G. H. B.

SLOTTED: An example of the 135 Curtiss O3C-1 scout observation biplanes ordered by the U.S. Navy. The machine is here seen equipped for carrier operation, but it may be employed as a seaplane if necessary. Handley-Page slots account for the excellent speed range of the type.



(Left) This remarkable action picture shows how the pilot parachute of an Irvin deploys the canopy (which has not yet completely left the pack) away from the wearer's body.

(Melbourne Argus.)

to envelop him, or in the event of similar contingencies. The rate of descent is 21ft. per sec.

The standard Service type Irvin, known as the "S S," or "Seat Service" type, is 24ft. in diameter, but for training and exhibition jumping a 28ft. model is produced. This may be used in conjunction with a small reserve chute 22ft. in diameter. The seat pack variety weighs about 20 lb.

Sixty yards of high quality silk, weighing between 1.4 and 1.6 oz. per square yard, are used for the canopy, which is formed of twenty-four "gores" of triangular shape, each composed of four panels, the seams of which form a zig-zag pattern round the whole canopy. The fact that the "warp" of the fabric is placed at an angle of 45 degrees to the centre line of each gore reduces the possibility of a tear progressing for any distance before being checked by a seam.

The Rigging Lines

Through the gore-to-gore seams pass the rigging lines. These are made of silk and are continuous, diametrically across the canopy. A certain amount of slack is left between the stitching of the lines to the gore-to-gore seams (there are four short lengths of zig-zag stitching to each gore) in order that, when the lines are stretched to their maximum length, the silk is not strained. The shroud lines are required to have a breaking strength of not less than 400 lb.

At each end the lines are connected to "D" rings on the main suspension straps of the harness, each in its correct sequence as it comes from the canopy. Webbing strap is employed for the harness. Due to the increasing speed of aircraft, a single thickness is now required to have a breaking strain of not less than 4,500 lb.

The seat pack parachutes employed by the R.A.F. are equipped with the "quick release" type of harness.

(Below) The Irvin "safety-belt harness," showing how simple it is for the wearer to release himself from his accoutrements and escape by parachute. In this view the rip cord housing and handle are clearly shown.

THE PARACHUTE

Part II.—Well-known Designs Reviewed : Some Ingenious Methods of Operation

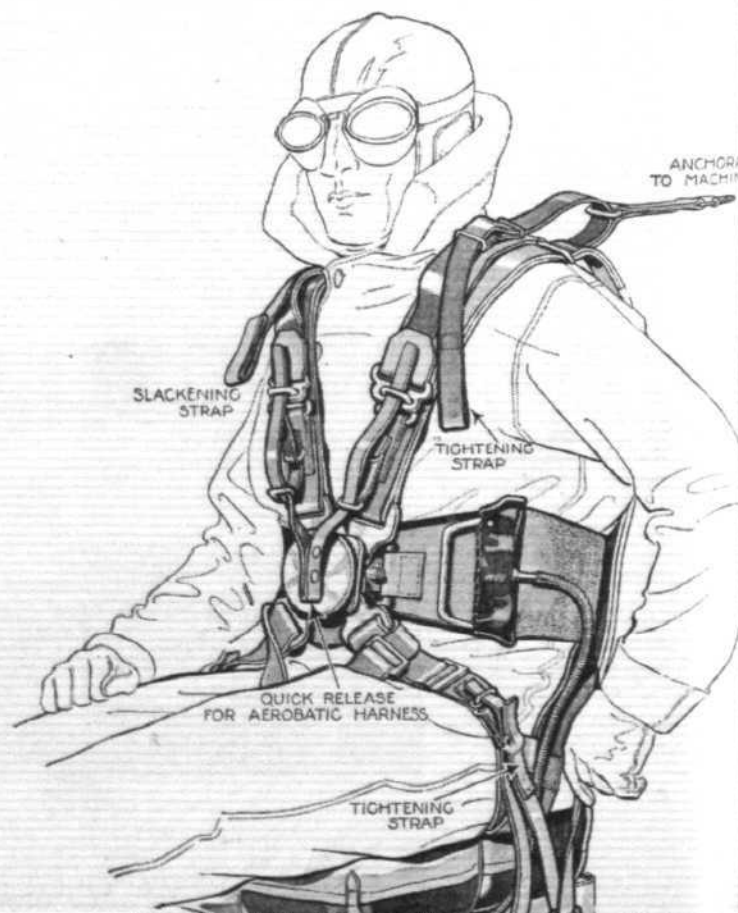
By H. F. KING

AT the present time four companies are manufacturing parachutes in this country. The products of each of these, as we shall see, have their peculiarities in design and, in certain cases, in performance also.

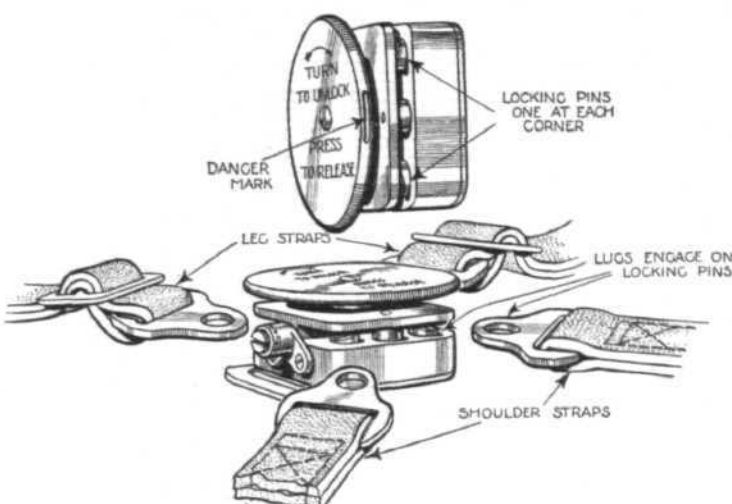
The Irving Airchute of Great Britain, Ltd., whose parachutes are known as Irvins—without the "g"—is fortunate in having its works within a short distance of Henlow, where all Service parachutes are tested, as described in the first instalment of this article. A number of Irvin types is available, each parachute being basically similar but differing in the position in which it is carried and the form of the pack.

By far the most widely employed is the seat pack type in which the folded parachute, in its container, is used as a cushion, fitting, usually, into a bucket-type metal seat and relieving the wearer of its weight. Such parachutes are standard for Royal Air Force pilots, and, for that matter, every flying member of the Service whose duties do not require him to leave his seat. A number of private owners have also adopted the seat pack.

The Irvin is a free, manually-operated type. That is to say, it is a self-contained unit operated by hand independently of the aircraft from which it is used. This means that the parachutist may leave his machine at whatever point suits him best. He may, if necessary, delay opening the parachute should wreckage threaten



(Right) Widely employed in the R.A.F., especially by air gunners, the Irvin "quick connector" equipment shown here allows the pack to be quickly attached to and detached from the harness.



The Irvin quick release used on Service parachutes. To unlock the box it is necessary to turn the disc, and when it is necessary to release the harness completely the disc is pressed inward.

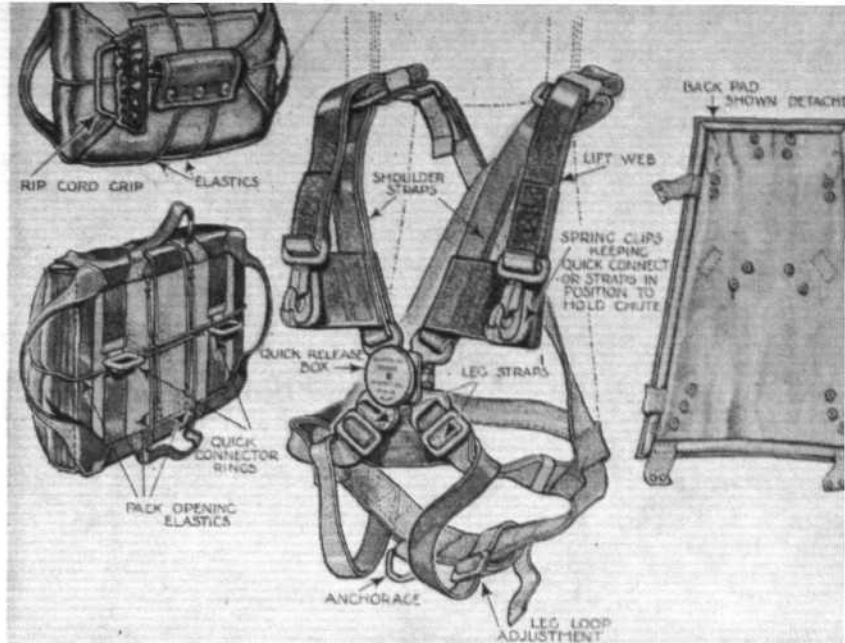
This was produced originally for the use of Fleet Air personnel, but was eventually adopted throughout the Service. A parachutist equipped with this harness is able to release himself from his parachute and its attendant gear just prior to his hitting the water.

One important difference between the quick release harness and the standard type is that, in the latter, the suspension straps, or lift webs as they are sometimes known, form a loop beneath the body. This means that there must be a considerable amount of auxiliary webbing to keep the loop in the correct position relative to the wearer's body. In the quick release harness the suspension straps themselves support and position the body in relation to the parachute.

From the seat pack each pair of lift webs pass up the back of the wearer, but separate after being led through an adjustment buckle near the shoulder. The outer straps of each pair are brought downwards over the chest to the special quick release attachment situated just above the stomach. Passing to the rear of the wearer's arms the inner straps go to form one thickness of the suspension loop: the second thickness is a strap whose ends pass up over the thighs to the release forming the lower suspension straps. Buckles are incorporated for adjustment. Separate leg straps are provided in the standard harness, but the modern quick release harness embodies in their place two pieces of strap connected through adjustment buckles and forming a loop which is kept in place by the front lower suspension straps previously mentioned. The quick release box is secured to this loop by a length of light webbing. For purposes of comfort and rigidity when the harness is being worn in an aeroplane, a back pad of fabric, filled with felt is incorporated.

A pocket for the rip cord ring, with an elastic mouth, is located between the front lower and rear suspension straps on the left side of the body. A pair of auxiliary straps, one at the shoulders and the other at the lower portion of the back, complete the harness.

The quick release box receives the four front suspension straps by means of eye fittings at their ends. Each of these is forced into a slot in a corner of the release box, clipping over a spring-loaded plunger and thereby being locked in position. In order to unlock the quick release gear a large press button is turned. To release the parachute entirely this button is pressed inward. The purpose of this dual action may be of interest.



Let us suppose a parachutist is making a descent over water. At a height of, say, 100ft., he turns the button on the release box, thus unlocking the gear. Just before he hits the water he presses down on the button, allowing the four front straps to become disconnected and freeing himself completely of the parachute, the sodden and deflated canopy of which might otherwise keep him beneath the surface.

The canopy is contained in a pack which is permanently attached to the bottom of the suspension strap loop. Aeroplanes whose pilots carry the seat type parachute are fitted with a special bucket seat to receive the parachute. A small cushion is provided between the wearer and the actual pack. The pack itself has six elastics which ensure opening when the rip cord is pulled. Opening is further aided by the springy nature of the silk canopy; it is claimed that the average time required for an Irvin to deploy completely and assume normal descent is about one and three-fifths seconds after the rip cord has been pulled. Four of the elastics previously mentioned open the sides of the pack and the other two operate the end flaps.

Following the rip cord from its handle on the left side of the harness one finds that it travels through a flexible housing to terminate in two pins which, when the parachute is in its pack, pass through holes in two cones, thus holding the complete pack together.

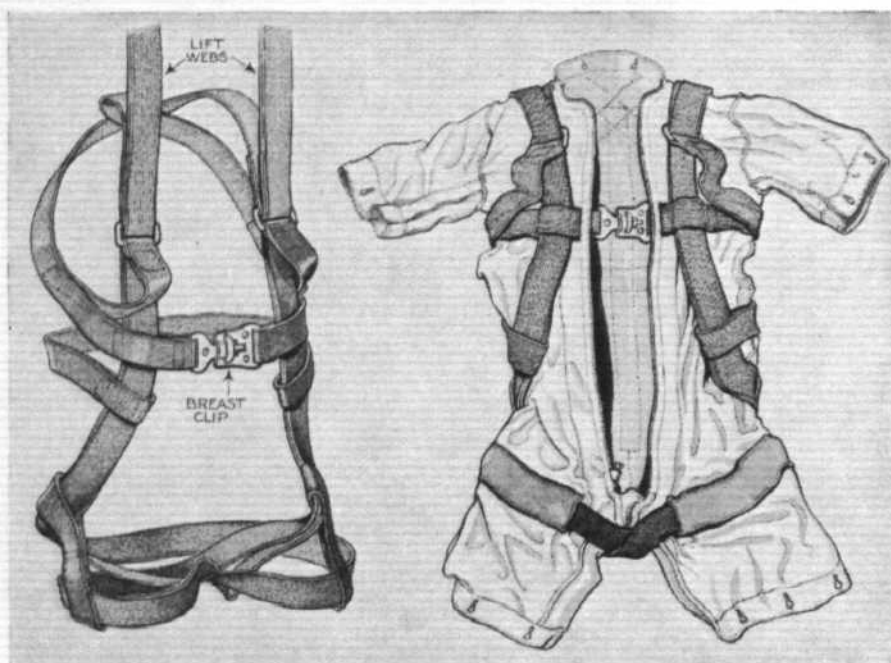
The Pilot 'Chute

Stowed within the pack and connected to the apex or peak of the main canopy is the small auxiliary or pilot parachute, the purpose of which is to lead the main parachute away from the body of the wearer and to increase the speed of opening. The Irvin pilot 'chute is of octagonal shape, 33in. in diameter, and cut from one piece of silk. It is mounted on a spring steel frame which forms four ribs and has spring coils at the centre.

To relieve the silk at the apex of some of the opening shock and to reduce oscillation of the parachute and wearer, a circular hole, 18 inches in diameter, known as the vent hole, is left at the apex of the canopy. Were this not provided the air would escape from beneath the periphery of the canopy, giving rise to severe oscillation. To eliminate possible entanglements during the opening of the parachute the shroud lines are stowed in loops in pockets within the pack.

The quick connector parachute, also widely employed in the R.A.F., is carried when not in use, detached from the harness. It is standard equipment for personnel not engaged in piloting an aircraft, and, in certain large machines for the pilot also. The pack, which contains a standard 24ft. canopy, is somewhat smaller than the seat pack, and when connected is attached to two snap hooks at the ends of the suspension straps on the front of the body. It is usually stowed during flight, in an easily accessible tray.

Specially designed parachuting outfits are also produced by the Irvin company for use from airships and balloons. A certain number of training outfits, which embody a 28ft. parachute, carried on the back, and an auxiliary 22ft. chute, are used in the R.A.F. Either of the two



These sketches show how the harness has been embodied in the detachable lining of a flying suit by the G.Q. Company. Loads are not taken by the garment itself.

parachutes may be operated independently of the other or both may be used during descent.

One particularly interesting Irvin product is a combined parachute and safety harness. The entire combined equipment, when not in use, can remain in the machine. In order to don the outfit it is only necessary to sit down and connect up the shoulder straps to the quick release box. The safety harness is fastened to the machine at three points—one behind the pilot's shoulders and one on each side near the floor. It is attached to the parachute harness just below each shoulder, on the front of the body and at each leg strap. The connections can be instantly released by jerking a strap on the pilot's chest. To lean forward he pulls an adjustment strap on his right shoulder. Another strap pulls him back into place; a toggle is provided to permit upward movement, and he is pulled down into his seat by another strap.

For use in cabin machines the company can combine parachutes and chairs. A typical model adds only seventeen pounds in weight. It is stowed away so that its presence does not detract from the appearance of the chair.

A 'Chute in a Suit

In addition to parachute equipment of a more or less conventional nature, the G.Q. Parachute Co., Ltd., at their Guildford works, manufacture what they call the "Harnasuit" and the "Parasuit."

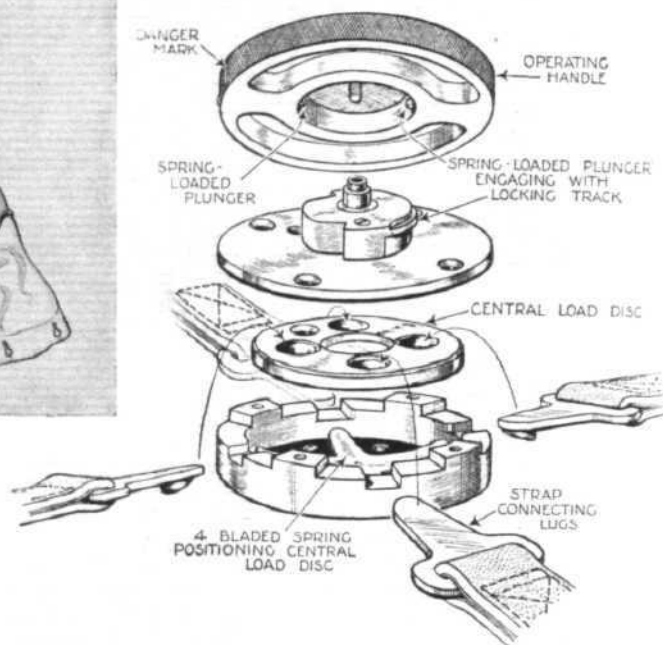
The former may be regarded as a standard service suit incorporating self-adjusting, detachable silk harness equipped with quick-connector hooks for a lap type parachute pack. The harness is attached to the lining, which is easily removable for inspection.

There are certain obvious advantages attendant upon this equipment. No individual need be adjusted to the harness: the outfit may be put on in an emergency more quickly than a separate suit and harness; there is a saving in weight, and, furthermore, flotation gear may be incorporated. This latter takes the form of an inflatable life-saving waistcoat. It may be inflated either by the mouth or from a small carbon di-oxide "sparklet" attached to the harness.

No load is taken by the suit itself under any conditions and it exhibits no tendencies to rise above the wearer's head during a descent. A number have been ordered by the Air Ministry for Service trials.

The "Parasuit" is another ingenious piece of equip-

(Below) The quick release gear employed by the G.Q. Company. Loads are taken by a central disc.

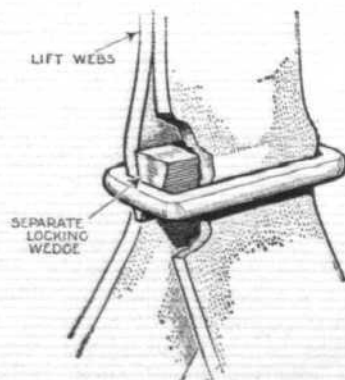


ment. A specially designed back type parachute pack is incorporated in a Sidcot suit, the harness, as in the "Harnasuit," being attached to the lining. For tropical flying the parachute equipment could be incorporated in dungarees. Perhaps the most notable feature is the flatness and flexibility of the pack (it is only about $1\frac{1}{2}$ inches thick) which allows ample freedom of movement, and gives a smooth exterior, a factor of great importance to members of the crews of military aeroplanes who are not required to remain immobile throughout a flight.

The locking cones of the pack are actually mounted on the base of the pack itself, protruding upwards through the folds of the standard 24ft. canopy. This latter is packed in zigzag formation, in four strands or layers. There are six rip cord pins, in two threes, divided between two wires connected to the rip cord handle, which is placed in the normal position. The pins are positioned by spring steel strips. From the pack the housings for the two rip cords converge and pass over the left shoulder. A pilot 'chute of the four-rib type with coil springs at the apex is stowed within the right-hand compartment of the pack.

Both the "Harnasuit" and "Parasuit" are recent developments, so the standard seat pack parachute is still in favour for general use. One commendable feature of the G.Q. seat packs is that they can be adapted to suit almost any design of seat: the pack frame may be made to any one of a variety of shapes.

The standard G.Q. canopy embodies twenty gores, each one being subdivided into four sections. There is an 18in. vent



A simple self-tightening harness buckle employed on the lift webs in G.Q. harness. The shoulder comes between the lower inverted "V" made by the straps.



The interesting Pak quick connector equipment. Note how a large portion of the harness webbing is enclosed in a skeleton vest.

at the apex. Basically of normal design, the pack incorporates a number of unusual features. There is, for example, but a single rip cord pin instead of the customary two. The lift webs, which, when the canopy opens, are jerked vertical from the harness, are positioned not by light stitching, but by two buttons, and the pack frame, should it receive damage during a landing, can be readily removed by unlacing a portion of the pack. By unfastening two buckles the complete pack may be removed from the harness. The company has lately developed a very neat and effective quick-release gear, the action of which is shown in the accompanying sketch.

An interesting feature of the G.Q. quick-connector pack is the method of attachment to the two snap hooks on the front of the harness. Instead of the usual two "D" rings there is a pair of long triangular members. These enable the pack to be snapped on quickly in an emergency without necessitating the finding of the two comparatively small "D" rings.

For training and certain types of exhibition work a 28-ft. parachute is manufactured. The company is also producing a type specially prepared for use from gliders. It has a 24-ft. canopy, but weight has been saved in the harness. The complete 'chute weighs only 15lb. Flax lines are standard on G.Q. products. These, it is claimed, are very durable, showing no picked ends after a long life.

So far the parachutes under review have employed canopies basically similar in design. The British Russell "Lobe" type embodies a number of noticeable differences. In this model the canopy is flatter and has a distinctive rim or "lobe" which, by holding what might be termed "ballast" air, minimises oscillation. Those who have witnessed drops with a Russell will doubtless agree that the descent is remarkably steady.

The "lobe" portion is formed by taking the shroud lines to the skirt of the canopy and thence to a point higher up, from which the lines run over the "dome" and continue down over the opposite side. It is claimed that, as a result of the peculiar design of the canopy, the opening shock is lessened.

No pilot parachute is employed. The manufacturers, apparently, are of the opinion that the auxiliary 'chute does not speed up the deployment of the main canopy. They claim that their parachute operates safely in a jump

from 100 ft. Another unusual feature is the pack, which embodies no elastic or springs to assist its opening. When the rip cord is operated, the pack literally collapses allowing the completely unimpeded escape of the main canopy.

A small vent hole is provided at the apex. The twenty-four rigging lines are woven of silk, the tensile strength of each line being 400 lb. Leading to the centre of the canopy are a number of lines, coloured red, which are used to collapse the canopy on landing if a heavy wind is blowing.

Either Japanese silk or special cotton may be used for the canopy. The latter is perfectly satisfactory for use from the slower types of aircraft, but if a parachute is required for employment from very fast machines, the silk type is more desirable.

The Russell harness, in which a quick release may be embodied, has a tensile strength of 2,750 lb. While the wearer is seated, the harness may be worn loose for comfort, but when he stands it tightens automatically. The "hardware" is drop forged nickel-steel, cadmium plated to prevent rust, and is tested at 2,500 lb.

It may be of interest at this point to quote from the maintenance instructions issued by the manufacturers. These state that if the parachute is given proper care, and does not become wet or soaked with oil, repacking is necessary every sixty days. Otherwise it should be taken from the pack and dried or cleaned. Steam dry-cleaning is recommended for petrol- or oil-soaked fabric. For drying purposes the parachute is hung up by the shroud lines in an inverted position. Drying should always be done in the shade, and the water must not be rung out of the fabric, but squeezed. It is pointed out that one of the



This is what happens when the rip cord of a British Russell seat pack is pulled. The shroud lines can be seen leaving the pack.

greatest enemies of the parachute is battery acid, the effects of which are slow-acting but far-reaching. The fabric and harness webbing is not discoloured but may be weakened to such an extent as to be readily pulled to pieces with the fingers.

Russell parachutes are well known to visitors to aerial "circuses" in this country. It was learned during a recent visit to the makers' factory at Stoke Newington that no fewer than 638 jumps have been made in this country this year. The Russell, incidentally, is used by the Chinese Air Force.

For the past three years experiments have been conducted in this country by the Pak Parachute Co., Ltd., whose works are at Mitcham. This company is now offering a range of parachutes of seat, "quick connector" and back types. Henlow tests were successfully completed in the Autumn of 1934. Pak parachutes originated in Czechoslovakia (they are standard equipment in the Air Forces of that country and Finland), but over here they are being made, under patents, from British materials.

The Pak model which departs farthest from conventional design is probably the observer's detachable or "quick connector" equipment. This embodies single-point connection, the ends of the lift webs terminating in a single snaphook. The silk harness, which may embody a quick release attachment if required, is adjustable to the person. As in other models produced by the company, a "skeleton vest" is incorporated. This fits snugly to the body distributing the pressure of the webbing over a large area. It also protects the webbing from wear and prevents possible entanglement.

The pack itself also embodies some unusual features. The elastic which assists opening, for instance, is in one piece, and is held in place by a simple leather attachment on the bottom of the pack, doing away with hooks and metal fittings. It will be noted on inspecting a Pak that no silk whatever is visible when the pack is folded. This is due to the fact that special corner flaps are provided at the opening for the lift webs. Another interesting detail refinement is to be found in the pilot chute, the spring coils of which are enclosed in a smooth egg-shaped duralumin box.

It will be realised that when the rip cord of a parachute is pulled, escape of the canopy must be instantaneous and infallible. Pak parachutes employ a universal ball-swivel locking cone which receives the rip cord pin. Under no circumstances is it possible for the cone to "sieze" the pin.

Either a single rip cord released manually or by a static line or a dual rip cord may be provided, the latest development being a dual manual rip cord to meet the demand for a release which may be operated by either hand. There is a possibility, of course, that in war time a hand may sustain injury.

One of the latest developments by the company is a duralumin quick release box which may be operated by a twist in either direction. A demonstration of a quick release harness revealed that when the box was operated, the wearer still sat in his harness and did not tumble forward on his face. On raising his hands above his head, however, and exerting himself, he was completely and immediately released. All loads in the quick release box are carried across a nickel chrome steel "spider" and not through the box itself.

The Back Pak

A back pack, available with either standard or quick release harness, also contains some interesting points. There is an articulated metal frame which is entirely flexible and follows the movements of the wearer when bending forward.

Those who have worn a seat pack parachute will appreciate the thoughtfulness of the designers in providing means permitting the seat pack to be hooked up on the back, while the wearer is walking, like a knapsack.

Normally the Pak canopy is of 24 ft. diameter. The circumference and vent are strengthened with woven silk tape. Twelve continuous lengths of silk cord form twenty-four rigging lines, each six being secured to one of the four lift webs. Incidentally, the Pak rigging lines are of "tubular weave" without a central core. This makes for elasticity and ensures that there is no possibility of hidden defects.

AIRSCREW BRAKES

THE last few years have seen a definite trend of thought on the part of leading aeronautical engineers toward airscrew brakes on multi-engined machines.

Mr. Raymond B. Quick, who is at present an engineering inspector for the American Bureau of Air Commerce, has carried out a very intensive study of propeller brakes, and has taken out a number of basic airscrew brake patents. Mr. Quick recently proposed a very simple brake design to the engineers of Sikorsky Aircraft, which resulted in their collaboration in the development and construction of a hydraulic airscrew brake. Such brakes were subsequently tested on the Sikorsky S.42, and recently placed in service on that machine by Pan American Airways. This is thought to be the first time that airscrew brakes have been used in a commercial operation in this country. The entire brake installation on the Sikorsky S.42, involving four propellers, weighs only 55lb.

The following reveals some of the advantages attendant upon airscrew brakes. Upon making a normal landing the pilot closes the throttles. However, the airscrews continue to windmill, causing an air turbulence over the adjacent portion of wing, thus spoiling the lift. If, however, the propeller is braked and stopped, the flow of air over that section of the wing will be smooth, resulting in higher lift.

Secondly the device scores in the event of engine failure. During test it was found that by stopping an outboard engine on the S.42 it was possible to correct for the loss of power by the use of the rudder instead of with both rudder and ailerons. This, of course, was due to a smoother flow of air over the portion of the wing near the engine, creating a greater lift than would be the case if the airscrew continued to "windmill."

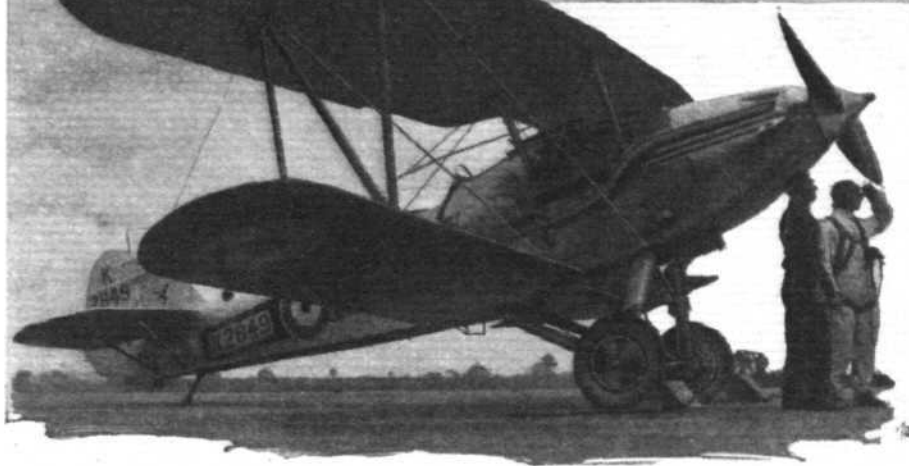
The resultant lift proved sufficient on the S.42 to correct for the loss of power. Disagreeable vibrations set up by the rotating airscrew of a "dead" engine are also eliminated.

In case of engine failure caused by a broken part the airscrew may be stopped at once, preventing further breakage or complete destruction of the engine.

The operation of the brakes as installed on the Sikorsky S.42 for Pan American Airways is as follows:—Arista oil is pumped manually from a two-quart tank through a check valve into a pressure accumulator, thence to a shut-off valve. Pressure is increased by the pump and maintained in the accumulator, which works against springs. The accumulator has a capacity of 2,000lb. sq. in. When the shut-off valve is opened the oil passes through the main line to the four control valves for the four airscrews. Any or all control valves may be opened to brake the airscrews singly or collectively. When a control valve is opened the oil passes into a cylinder bracketed by four bolts on to the engine nose section. The cylinder contains two petrol- and oil-proof pistons; these are expanded by the oil, which has an operating pressure of 1,000-2,000lb. sq. in., forcing the brake bands against the drum. The brake drum is machined from a steel forging, and has cooling fins. It is connected to six hub bolts on the three-bladed airscrew by welded steel fittings. The brake shoe is hinged by six bolts to the nose section. A spring, which is attached to the brake bands at the cylinder, returns the piston to a neutral position when oil pressure is released. The oil then returns to the tank.

Sikorsky Aircraft has had such great success with these propeller brakes that it contemplates testing a set on the new S.43 amphibian, and will undoubtedly include them as standard equipment on all future models.

FOR THE NEW SQUADRONS



The expansion of the Royal Air Force is now in full swing. Apart from the establishment of new air stations, schools, etc., it calls for increased output of aircraft and engines. Some of the fighters which will be used for the equipment of new squadrons and for the re-equipment of existing squadrons are discussed in this article

EXPANSION is in the air. Orders have been placed by the Air Ministry for large batches of aeroplanes to be used by new units of the R.A.F., and final details of further contracts are being discussed. It is contrary to the policy of the Air Ministry to permit publication of the exact number of machines ordered under any particular contract, but the total number of aircraft needed will be well over 2,000.

Certain of the machines now under construction are developments of existing Service types. The others are of new design. Some of the more recent of these latter will not come into the limelight for some months. It is proposed in this and subsequent articles to review the various types on order and to discover as far as possible how they compare with machines going into service abroad.

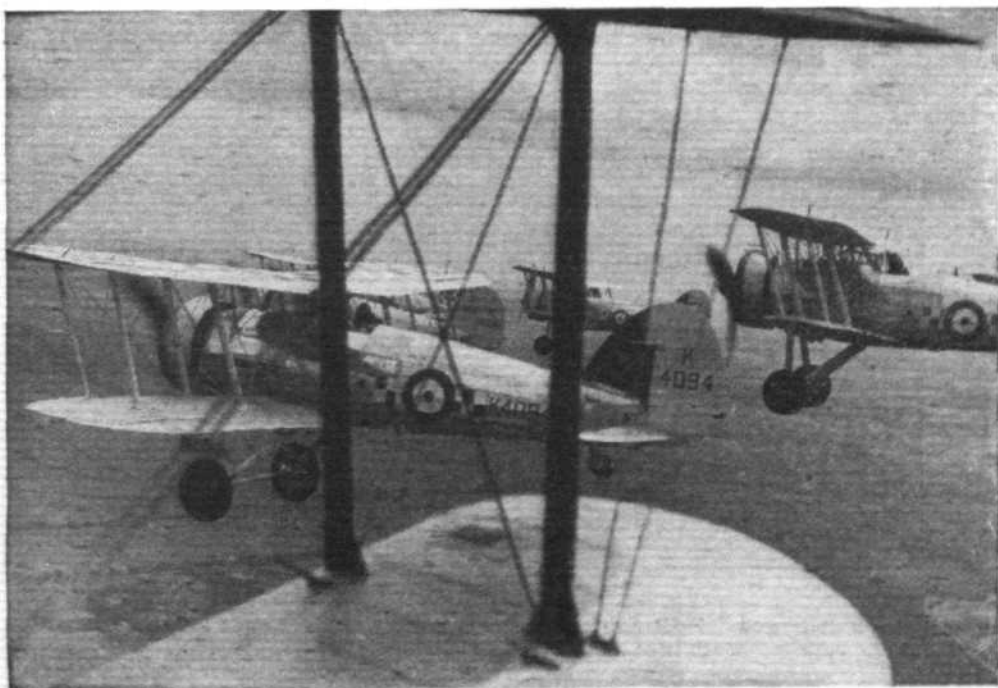
Great Britain may, perhaps, have been "marking time" in the development of certain types of military aircraft. The fighter very definitely is not one of these. Six types of fighters are on order, four for land service and the other two for the use of the Fleet Air Arm. They are the Gloster "Gauntlet" and "Gladiator," and the improved Hawker "Fury," "Demon," "Nimrod," and "Osprey." Both the "Gauntlet" and "Gladiator" are single-seater day-and-night fighters, which means that they have a longer endurance than the interceptor class, and carry a more comprehensive military load. One squadron of the former type is already in service, and a number of additional units are soon to receive it, whereas the "Gladiator" has only recently been accepted.

The "Gauntlet" is of interest from a number of viewpoints, especially from that of the student of military flying who has watched the monoplane finding increasing favour abroad. To him, no doubt, the most striking feature of the design is the two-bay wing cellule—the "Gauntlet" is the only two-bay fighter

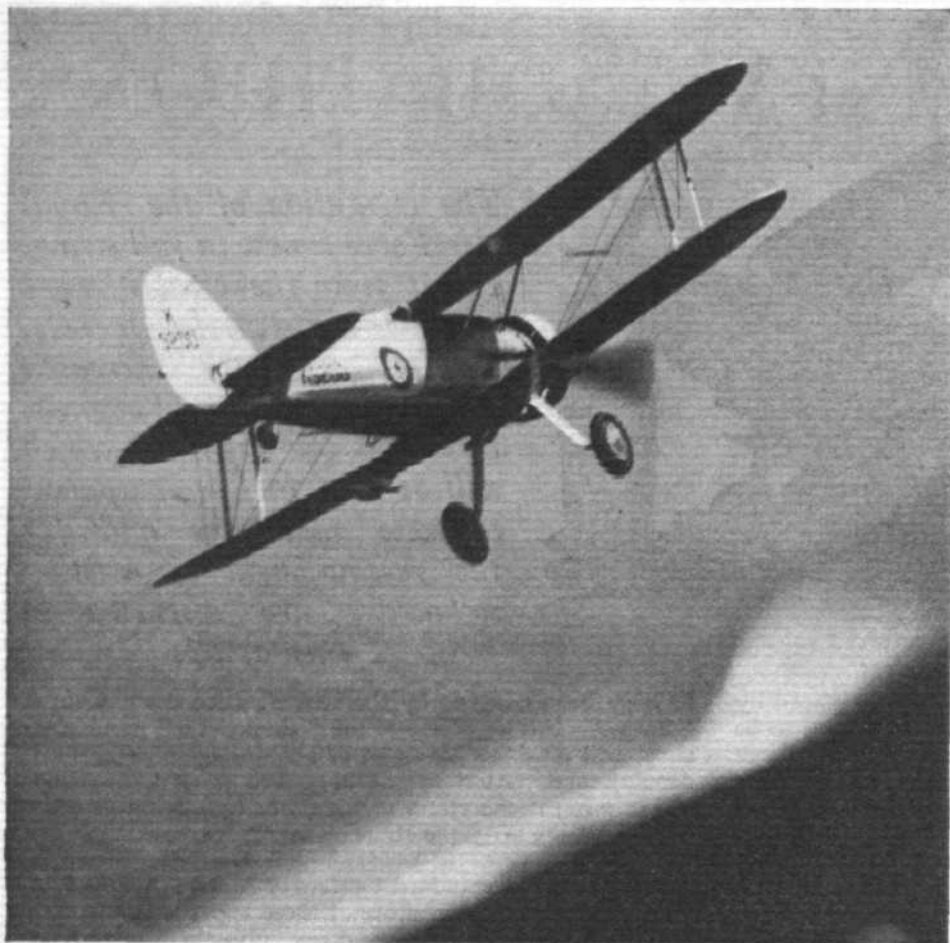
to have been adopted by the R.A.F. since the days of the "Snipe." But a perusal of the "Gauntlet's" performance sheet will disabuse his mind of any thoughts regarding its obsolescence. At a height of 15,800 ft. it is capable of 230 m.p.h.; it can climb to 16,000 ft. in 6.25 min., and its service ceiling is 35,500 ft. This compares favourably with the performance of the Boeing P-26A, Dewoitine D.500, and Fiat C.R.30, the standard fighters of America, France, and Italy. Possibly one or more of these types is faster, but it loses in climb and ceiling and undoubtedly in manoeuvrability. Those who attribute this remarkable performance to luck or sheer engine power will do well to examine the next "Gauntlet" they see. They will discover a very beautifully shaped fuselage of oval section, an *empennage* completely void of struts, and the cleanest cross-axle undercarriage they have seen. The machine looks just "right."

The latest type of "Gauntlet," the Mark II, differs from its predecessor in a number of details, notably in that it has a Hawker-type rear fuselage of square-section tube, warren-girder braced in the side bays, and Hawker spars.

A Bristol "Mercury VIS" nine-cylinder geared and supercharged radial is fitted, being equipped with a long-chord combined Townend ring and exhaust collector. This is the first engine to go into service using the new fuel of 87 octane



No. 19 (Fighter) Squadron flying its "Gauntlet Is." The latest type of "Gauntlet" differs in certain ways from this mark, but the variations, which are of a structural nature, are not externally obvious. (Flight photograph.)



The Gloster F.7/30, now known as the "Gladiator," is the latest fighter to be ordered for the R.A.F. Four guns are carried, two in the fuselage and the other pair beneath the lower main planes. (Flight photograph.)

selected for adoption, is now known as the "Gladiator." A direct descendant of the "Gauntlet," it has single-bay wings, single-strut undercarriage—in fact, it is a singular machine. Even with the same engine, its speed is higher than that of the "Gauntlet," although possibly its climb and ceiling are a trifle inferior. In all probability, when the type enters service it will be fitted with a newer type engine, possibly a sleeve-valve "Perseus" of about 700 h.p. Perhaps a V.P. airscrew may also be seen. The undercarriage employs Dowty internally-sprung wheels. These do not make bad angles with the struts, which, compared with the thick trunks found in certain American types, must be considered very dainty.

At the R.A.F. and S.B.A.C. displays the prototype "Gladiator" carried two Vickers and two Lewis guns, the former in the fuselage, and the latter slung one below each wing. The Lewis's caused rather unfortunate "blisters" on the under surface of the lower planes, but they are obsolescent. Perhaps we shall

eventually see machine guns of a later pattern. The Air Ministry has ordered a number of American Browning guns, but whether for issue or experiment cannot be said.

From multiple guns it is not a far cry to the subject of *canons*. Experiments have been conducted with these weapons in this country for a long time past, so that the Air Ministry is fully aware of their limitations and capabilities. France certainly seems highly enthusiastic about the *canon*, either as mounted between cylinder banks of a Vee-type engine, or placed in the wings. The Hispano Suiza *moteur canon* is soon to be manufactured in this country.

The "Fury" and "Demon" are already well-known types, the former, probably, as well as any fighter in the world. It was produced originally for an interceptor competition, having a high rate of climb at the expense of a certain amount of endurance. Up to the present the Service has known it only with the 525 h.p. Rolls-Royce "Kestrel IIS" engine. Soon it will be issued fitted with the 600 h.p.

number. At normal r.p.m. it delivers 605 h.p. at 12,500 ft. and a maximum of 645 h.p. 3,000 ft. higher. It may be regarded as a "Pegasus" with a reduced stroke bringing down the overall diameter. Obviously a radial engine of large diameter has its drawbacks in a single-seater fighter, not only for aerodynamic reasons, but because it obstructs forward view. The "Pegasus" is on the large and heavy side for modern single-seater use. Similarly, in the U.S.A. the big "Cyclone" and "Hornet" radials, which are analogous to the "Pegasus," are being superseded in single-seater fighters by smaller engines. Over there the two-row design is being adopted for this purpose.

As regular readers know, the Air Ministry has been holding a competition for day and night fighters (the "Gauntlet" is regarded as an "interim" replacement) built to a specification known as F.7/30. Among other things this specification called for a heavier armament than that mounted in previous Service fighters. The Gloster entry, which has been



Hawker "Nimrod" Fleet fighters will appear with "Kestrel V" engines. The present Service type "Nimrod," as seen here, has the "Kestrel IIS." "Ospreys," also, will receive the "Kestrel V."

No. 23 (Fighter) Squadron, which was the first unit to receive the "Demon" two-seater fighter, is here seen breaking from an echelon formation. Future "Demons" will have the 600-h.p. "Kestrel V."

"Kestrel VI," which uses 87 octane fuel. This should improve the performance very considerably, and the speed of the present type (214 m.p.h. at 13,000 ft.) by at least 25 m.p.h. Whether the three present "Fury" squadrons only will receive the improved type, or whether it will be issued to additional units, is not known.

A number of squadrons, including auxiliary units, will receive the Hawker "Demon." This type first saw Service life as the "Hart Fighter" with No. 23 (Fighter) Squadron, which put three machines of the type through their Service trials. In its latest guise it has a 600 h.p. "Kestrel V" engine and does over 200 m.p.h. It may be used for day and night flying, carries wireless equipment, and is armed with two synchronised guns and one free gun.

It is remarkable that the U.S. Army Air Corps, which put a few B/J two-seater pursuit biplanes into service as an experimental measure at about the same time as the "Hart Fighters" were delivered, still has only a small number of this type in use, whereas Great Britain has four squadrons of "Demons" in service, and contracts for several more squadrons have been placed. However, a large number of Consolidated P-30 two-seater pursuit monoplanes are being built for the U.S. Army Air Corps. These machines are low-wing cantilever monoplanes with liquid-cooled Curtiss "Conqueror" engines employing exhaust-driven superchargers. According to the views of some British engine designers, this is a bold step to take. About 250 m.p.h. is expected. Both France and Italy are exhibiting interest in the two-seater type as a fighter, but neither nation has yet adopted any machine in this class.

Soon, no doubt, we shall see our two-seater fighters with enclosed cockpits, offering protection to the rear gunner, who at present is very badly handicapped. Curiously enough, a standard General Purpose machine has received such refinement before our specialised two-seater fighters.

Certain Fleet Air Arm squadrons will receive improved "Nimrods" and "Ospreys." The former, fitted with the "Kestrel IIS," has, for about four years, been the standard single-seater Fleet fighter. In its new form the "Kestrel V" will be mounted. Similarly, the "Osprey," which, as now

in service, employs the moderately supercharged "Kestrel IIMS," will receive the fully supercharged "Kestrel V." With the older type "Kestrels" the "Nimrod" and "Osprey" did about 192 m.p.h. and 175 m.p.h. respectively, so the performance of the new versions with engines giving nearly 100 h.p. more can be gauged to within a few miles an hour.

The "Osprey," which we are classing here as a two-seater fighter, is more accurately termed a Fleet fighter reconnaissance type. It was the first of its class to see service in the R.A.F. America, which, prior to the "Osprey's" adoption, had been using from its aircraft carriers a number of Curtiss "Helldivers"—light dive-bombers *cum* two-seater fighters—appears to have dropped the class. Single-seaters are mainly employed for dive-bombing with the American fleet, the two-seaters, although capable of operating as bombers, functioning chiefly as observation and spotting types.

(To be continued next week.)



Rolls-Royce "Kestrel VI" engines will be fitted to future "Furies" for the R.A.F. Here a flight of No. 43 (Fighter) Squadron, one of the three "Fury" units now in service, is seen landing in formation. (Flight photograph.)



Private Flying

Topics of the Day

Private Pilots in the U.S.

THOSE embryo pilots who complain gently of the need for performing mental gyrations around minor points of air legislation, and who look on the simple practical tests for their "A" licences with misgivings, would be doubly horrified if they were suddenly transported to the United States.

There, the examination for a private pilot's licence is much more stringent. The oral examination, for instance, must be passed *before* making a first solo flight, and the experience requirements demand fifty hours of solo flying, including five within the sixty days prior to the application.

An interesting reservation, which might well be applied in this country, concerns the definition of the words "solo flying." After ten hours of genuine solo work, the pupil may count all those flying hours in which he is in entire control of the machine, although accompanied by an instructor or professional pilot. A medical examiner issues a student pilot's licence to him before he starts a course of instruction, and this licence automatically specifies the highest grade of licence which his physical qualification will eventually allow him to obtain.

A Thorough Examination

IN addition to tests of his capacity to deal with normal take-offs and landings, the private pilot in America must cut the throttle at 1,500ft., make a 360 deg. turn, and land in front of and within 200ft. of a designated line; descend from 1,000ft., make a 180 deg. turn and touch down at the same spot; spiral down from 2,000ft. and make a spot landing as before.

He must make a series of three gentle and three steep figure-of-eight turns as well as steep 720 deg. power turns in each direction.

The pupil must also demonstrate his ability to make cross-wind landings and take-offs, to spin, "spiral," sideslip, make climbing turns, recover from a stall, and to do any other manoeuvre deemed necessary by the particular inspector.

Before renewal of his licence, the private pilot is expected to have done at least fifteen hours' flying within the preceding twelve months.

In addition to the student pilot's and private pilot's licence there is also one for the "amateur pilot," who is not, however, permitted to carry passengers. The tests for this licence do not include spins, cross-wind work or 720 deg. power turns, and only twenty-five solo hours are required, with at least five hours in the sixty days preceding application.

All of which might suggest that our licence regulations require a little stiffening up were it not for the fact that the entire responsibility is borne by the instructors, who see that their pupils can actually do all these things even though the regulations do not demand their execution. The different clubs in this country have private rules and regulations for entry into the passenger-carrying category.

Those Log-books

MOST private owners find that their log-books are something of a trial to them, and the Journey log-book, in particular, is far more complex than is really necessary. Perhaps in due course the Air Ministry will devise some simpler books, especially for the amateur.

Incidentally, A.N.D. 11 directs that the Journey log-book must be carried on the machine and that the Certificates of Registration and Airworthiness must be kept therein. Because it is often difficult to reach the cockpits or the locker after the wings have been folded in the hangar, many owners leave the book on a shelf in the hangar and thereby break various rules. The alternative is to make the entries while the machine is standing outside on the tarmac.

The log-book itself calls for entries on the right-hand side of the names of the occupants and of their specific duties, which must be signed by the pilot-in-charge, for details and times of every departure and arrival, with any necessary remarks—which, presumably, are not intended to be either humorous or personal. The left side is supposed to be devoted to details of any signals received or transmitted and to things of that kind. Naturally enough, it remains blank save for odd pencilled calculations and for any funny pictures which the owner may see fit to execute.

Amateur Accountancy

IN the Aircraft log-book one must enter each date on which the machine is flown, giving the time in hours or minutes, and a space is left for entering the details of any repairs carried out. There is an additional column in the Engine log-book for the insertion of "time run on ground," but otherwise the entries are similar.

When a new page is reached the unfortunate owner must add up a column of figures going back to the date of the birth of the engine, and/or of the machine, another going back to the date of the last complete overhaul, and yet another returning to the last 150-hour overhaul or other period as specified by the makers.

One is expressly told that the entries must not be made in pencil, but it is probable that the majority of owners use pencil as the more convenient medium for the Journey log-book and ink it all in at a later date. The other books are left for weeks or even months until such a time as an evening can be spent in filling them up from the Journey log-book.

The whole business is, in fact, a considerable nuisance, and I wonder how many impatient motorists would give up motoring if, in addition to their rather exaggerated tribulations under the new laws, they were compelled to make entries concerning their daily movements.

Needless to say, some form of control is absolutely essential, but there are, even now, a sufficiently large number of owners to make a special system worth while if only to help to encourage ownership.

INDICATOR.

FROM THE CLUBS

Events and Activity at the Clubs and Schools

LIVERPOOL AND DISTRICT

During the past week the weather conditions in the Liverpool area have been very good and 80 hr. 10 min. were flown by the Liverpool and District Aero Club at Hooton Park and Speke.

MIDLAND

Flying times at the Midland Aero Club for the week ended August 8 were, dual 19 hr. 20 min. and solo 20 hr. 55 min. New members included Mr. T. Nicholson. Cross-country flights were made to Braunstone, Tollerton, Hucknall, Farnborough and Whitley.

READING

Four new pupils joined the Reading Club last week, Dr. Smith made his first solo flight, and Mr. Bird has qualified for his "A" licence. The works are very busy on the thirteen machines which are being flown in the King's Cup Race.

CIVIL AVIATION SERVICE CORPS

Two members of the C.A.S.C. flew at Fen Ditton on Monday of last week and one of them, Mr. S. A. Dew, passed his "A" licence tests. On Sunday, eight members put in 2 hr. 40 min. of instructional flying and 1 hr. 45 min. of solo flying.

WITNEY AND OXFORD

During the week ended August 10 the flying times at the Witney and Oxford Aero Club were, solo 14 hr. and dual 8 hr. 35 min. One cross-country flight was made to Portsmouth, Mr. A. O. Cundy passed his "A" licence tests, and Mr. D. A. D. Cather has joined the Club.

REDHILL

Last week was a particularly busy one at the Redhill Flying Club, the flying time totalling 90 hr. 10 min. Mr. H. Dalrymple White made his first solo, and Messrs. C. Derington Turner and H. A. Watts carried out their "B" licence night flights. Four new members have joined the Club and three new blind flying certificates have been obtained.

CAMBRIDGE

The exceptionally fine weather has enabled Marshall's Flying School and the Cambridge Aero Club to break all records. New members keep rolling in, and the flying time last week totalled 65½ hr. Messrs. Barnett, S. A. Dew, R. A. Jones and Edgley completed their "A" licence tests and some six other members will be ready during the coming fortnight.

HANWORTH

Two first solos—by Mrs. Wyndham and Mr. Salm—were made last week at the London Air Park Flying Club and two new members joined. The flying time during the week totalled 50 hr. 30 min. and Mr. H. McClelland, the gliding pilot, is taking a course of instruction in power flying.

The flying time at the Autogiro School last week totalled 66 hr. 55 min. and first solos were made by Messrs. Altschul, Abbott, Anderson and Van der Velden; the latter two obtained their "A" licences. Six new pupils joined the school, including Senor Romeo and Mr. Mulla, who are taking full "A" licence courses. A new C.30 was flown to Italy for the Italian Government by Mr. R. A. C. Brie.

LEEMING

Taxi trips were undertaken by Yorkshire Aviation Services last week to the Isle of Man and twice to Liverpool. The latter trips were to enable passengers to catch the Dublin boat for the Horse Show.

Among the pupils, Mr. A. T. Lawson-Tancred made a first solo. During the week ended August 11 74 hr. 10 min. were flown by the school.

On Saturday a busy morning was spent taking a party for joy rides from Rowntree's works, and on Sunday another factory visited the aerodrome, but in this case Mr. W. Mason, a pupil, took ten of his employees up himself in one of the school machines.

LONDON

In spite of the departure of people for their various holidays at Blackpool, Biarritz or Budapest, the London Aeroplane Club has again been almost unreasonably busy during the past week, in which 140 hr. 15 min. were flown. Last month, incidentally, the hourage came to the prodigious figure of 615 hr. 5 min. This sounds for all the world like a record—and a much more useful record than some. Can any other clubs beat it?

Eight members made first solos during the week—Messrs. G. W. Kerr, T. A. Marks, E. F. C. Burton, I. G. Hopcroft, H. R. Freemantle and H. J. Blackshaw, Miss G. D. Stevenson and Mrs. Barton. Of these, Mr. Kerr and Miss Stevenson passed their "A" tests along with Mr. C. G. Cagg. A new "Tiger Moth" has been delivered.

The entry lists for the competitions in navigation, map reading, forced landings, and aerobatics, which will be run next month, are now open.

BROOKLANDS

Eight new members joined the Brooklands Flying Club last week and first solos were carried out by Messrs. Mazloumian, Deo and Ritchie. In addition, the Hon. Bowes Lyon and Messrs. Tweedie, Mazloumian and Chalkley have completed the tests for their "A" licences. Four pilots made their night flights for their "B" licences, one of whom, Khan Aga, has passed all his tests.

Brooklands Air Taxis have been very busy, and machines flew to Monte Carlo, Dublin and Le Touquet, as well as to several provincial towns. Bookings are flowing in, and one has been made as far ahead as October for a trip to the Gold Coast.

NORFOLK AND NORWICH

At mid-day on August Bank Holiday the Norfolk and Norwich Aero Club sent a flight of machines for the launching of the Caister lifeboat. The machines circled the scene of the ceremony in close formation, and dived past in salute.

F/O. M. Daunt, late of No. 25 Squadron, has been engaged as an assistant instructor during the period of the Public Schools Aviation Camp. Mr. Birchall, of Taunton School, the originator of the scheme, arrived early in order to make final arrangements.

Recently the Club undertook two charter trips to Heston and Abridge, and H. C. Harrison has passed his forced landing and cross-country tests.

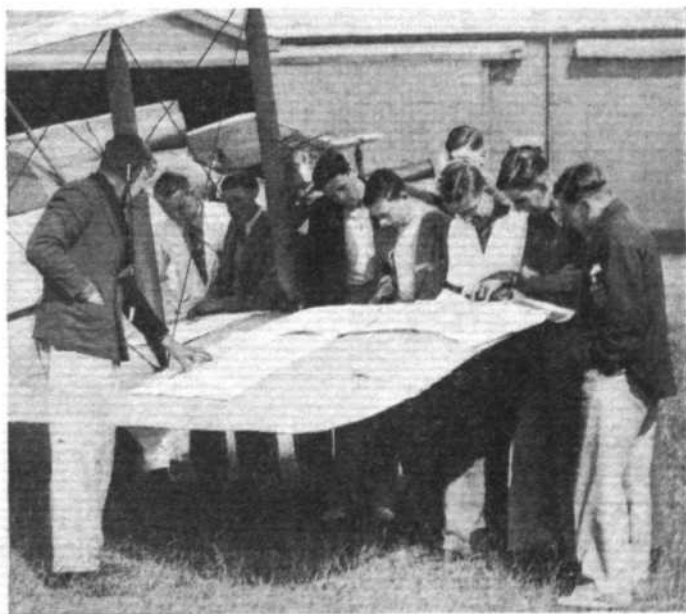
Last week members and boys compiled a total of eighty-eight flying hours—a record for the club. The aviation camp boys put in sixty-six hours.

SHEFFIELD

The Sheffield Aero Club started operations on August 1 at its aerodrome at Nether Thorpe, which lies about four miles west of Worksop, Notts. This aerodrome was formerly occupied by Mr. R. Sorby Horrox, a private owner, who is, incidentally, a director of the new club, which will serve a wide area in the North Midlands. As instances this fact it might be mentioned that three of the directors who hold "A" tickets obtained them through clubs as far removed from Sheffield as Hull, Woodford and Sherburn-in-Elmet.

The prospects appear to be very good. There was a nucleus of some thirty who had promised their support and new members are being enrolled each day. All the requisite capital has not yet been subscribed, but the chairman, Mr. R. Jakeman, has loaned a D.H. "Moth" to the club for instructional and other flying. During the first week the time flown by the pilot and instructor, F/O. L. S. Tindall, has been 14.05 hours, dual, as well as that taken in forty-two joy rides.

The aerodrome is situated in attractive surroundings and, with the erection shortly of a comfortable clubhouse, the directors are confident that before long the aerodrome will be very busy.



AT NORWICH: Once again the Public Schools Aviation Camp is in full swing under the auspices of the Norfolk and Norwich club. This picture shows some of the boys in a typical photographic attitude poring over a set of flying maps.

Private Flying

NORTHAMPTONSHIRE

On Sunday Mr. J. W. Tomkins flew, for the first time, his Gloster "Gamecock." The test appeared to be highly successful.

Visitors during the week included Miss Mary Lawson, who had tea and later flew over Overstone, where she is camping. Miss Page and Mr. Bromet, of the Northampton Repertory Company, also flew with the club.

HERTS AND ESSEX

There was a large entry for the second annual aerobatics competition for the "Mollison" Challenge Cup. The winner was Mr. V. A. Ercolani, second was Mr. K. J. Lindy, and third Mr. H. A. Ellis. Incidentally, first and second awards were placed as in last season's competition. Mr. and Mrs. J. A. Mollison arrived in the Beechcraft and presented the trophies during the evening.

Mr. G. F. Madin (Australia) made his first solo flight. Two new members, Messrs. D. W. Saunders and J. F. Millard, have joined. The aerodrome will be one of the turning points in the final of the King's Cup Race on Saturday, September 7, and the Social Committee propose holding the second Aerofete on that day.

Flying times last week were 35 hr. 22 min. dual, and 62 hr. 24 min. solo. Another "Moth" has been added to the Club fleet, making a total of five "Moths" and one "Hawk."

Jubilation

DURING its tour of the British Isles, which was carried out last week, the "Jubilee" Monospar visited twenty-eight aerodromes and twenty-four flying clubs. The miles flown totalled 3,350, and the average speed was 112 m.p.h.

No fewer than 248 passengers were taken up, and forty-seven different pilots tried the machine. Some ninety landings were made in the course of the tour, which started on Saturday, August 3, and finished on Sunday, August 11. No trouble of any kind was experienced, and the General Aircraft Company have two hundred autographed appreciations.

A NEW V.P. AIRSCREW

Electrically Operated Ratier with Interesting Features

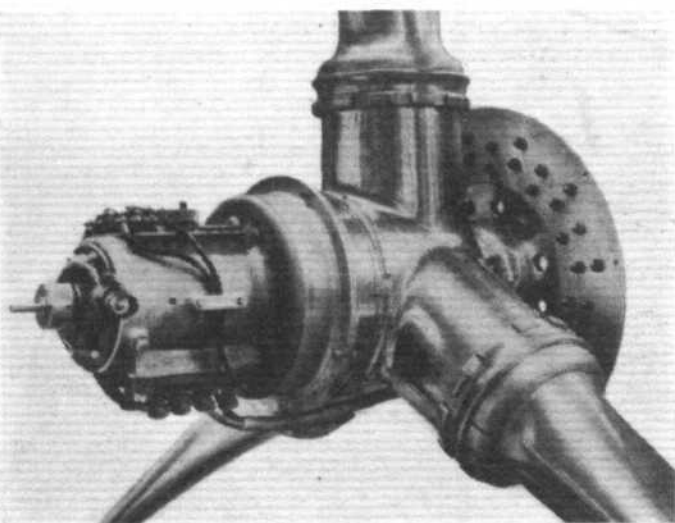
A NEW Ratier model, which has already been used with considerable success in races, as, for example, on the Percival "Mew Gull" with which M. Guy de Chateaubrun won the Grand Prix de l'Aero Club de France last month, has an unusually wide range of controllability and can be "feathered" to 0 deg. of pitch so

that the blades are fore and aft. This attribute means that with multi-engined machines it will be considerably easier to obtain a good performance with one engine out of commission.

The general design of the new model is the same as that of the two-position pneumatically operated controllable-pitch airscrew with which the D.H. "Comets" in the England-Australia Air Race were fitted, but the air pressure plate on the nose of the hub, by means of which the pitch was changed, has been replaced by a small electric motor. The duralumin blades of both types have threaded roots which are screwed into helicoidal ball-bearing races in a steel hub. The centrifugal force by its outward pull tends to rotate the blades into high pitch, while the torsional moment, depending on the shape and curvature of the blade section, tends to turn them in the opposite direction and into low pitch. These forces thus oppose one another and the angle at which the helicoidal ball-bearing races are mounted in the hub is so arranged that the components of these forces produce a neutral equilibrium. The blades can therefore easily be turned about their own axes, to increase or decrease the pitch.

The electric motor, which has a power of 1/25 h.p. and turns at 3,000 r.p.m. under full load, works a reduction gearing which in turn transmits movement to the blades through a piston and connecting rods on the blade roots.

The two-bladed airscrew suitable for engines of up to 220 h.p. has a diameter of 6ft. 9in. and the complete weight is 62 lb.



A Ratier V.P. airscrew, designed for the 650 h.p. Hispano engines of the Latécoère 300 flying boat. It weighs 382 lb.

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in the list.

Aug. 10-20. Second International Austrian Alpine Flight.
Aug. 24-25. Third International Flying Meeting, Lympe.
Aug. 24-Sept. 1. National Gliding Competition, Sutton Bank.
Aug. 24-25. Cinque Ports Club. International Flying Meeting and Wakefield Cup Race.
Aug. 24-30. Raduno del Littorio, Rome. Reale Aero Club d'Italia.

Sept. 6-7. King's Cup Air Race. Start and Finish: Hatfield.
Sept. 14. Cinque Ports Club. Folkestone Aero Trophy Race.
Sept. 15. Gordon Bennett Balloon Race, Warsaw.
Sept. 21. London-Cardiff Race. Cardiff Aeroplane Club.
Sept. 28. Round the Isle of Wight Air Race and Portsmouth Air Trophy.
Oct. 12-28. International Aircraft Exhibition, Milan.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS



Henlow Athletes: Winners of King George V R.A.F. Athletic Team Challenge Cup. Group Capt. J. McCrae, M.B.E., Commanding Officer, Home Aircraft Depot, is in the centre of the group.

CHANGES IN THE HIGHER COMMANDS

The Air Ministry announces the following appointments:—

Air Commodore John Eustace Arthur Baldwin, D.S.O., O.B.E., now Air Officer Commanding No. 1 Air Defence Group, to be Director of Personal Services, Air Ministry, on August 22, 1935, vice Air Commodore Edmund Digby Maxwell Robertson, C.B., D.F.C., R.A.F. (Retired).

Air Commodore John Charles Quinell, D.F.C., now Senior Air Staff Officer, Western Area, to be Air Officer Commanding No. 1 Air Defence Group, on August 22, 1935, vice Air Commodore John Eustace Arthur Baldwin, D.S.O., O.B.E.

Air Comdre. J. E. A. Baldwin was seconded to the Royal Flying Corps from the 8th Hussars early in 1915 after graduating at the Central Flying School (Royal Aero Club Certificate No. 971). During the Great War he served in France, having been in command of No. 41 Wing in 1917 and reached the rank of Lieutenant-Colonel in 1918, in which year he assumed command of No. 1 School of Navigation and Bomb Dropping. The following year he was granted a permanent commission in the Royal Air Force and in 1923 he graduated at the Royal Air Force Staff College. Following several years engaged on staff duties at the Middle East Command Headquarters he was given command of the Central Flying School in 1929. In January, 1932, he was appointed to the Headquarters Fighting Area where he was promoted Air Commodore and became Senior Air Staff Officer early in 1933. Since February, 1934, Air Comdre. Baldwin has been Air Officer Commanding, No. 1 Defence Group. He acted as Air Aide-de-Camp to the King from August, 1931, to December, 1932.

For his services in France during the Great War he was awarded the D.S.O. in 1918 and the O.B.E. in 1919, besides being mentioned three times in despatches. He also holds a Belgian Order and a decoration.

Air Comdre. J. C. Quinell was seconded to the Royal Flying Corps from the Royal Field Artillery in 1915, after graduating at the Central Flying School (Royal Aero Club Certificate No. 1175). During the Great War he served in France and Iraq and in 1919 was granted a permanent commission in the Royal Air Force as Squadron Leader. In 1924, following service in India and in command of No. 3 Flying Training School, he graduated from the Royal Air Force Staff College and was employed on air staff duties at home and in Iraq until placed in command of the School of Naval Co-operation in 1931, in which year he was promoted to the rank of Group Captain. From 1934 he has been Senior Air Staff Officer

at the headquarters of the Western Area, and was promoted to his present rank in July, 1935.

He gained the D.F.C. in 1919 for distinguished service during the Great War and was also mentioned in despatches.

NOMENCLATURE OF AEROPLANE—"ANSON"

The official name of the Avro coastal reconnaissance aeroplane fitted with "Cheetah" engines is "Anson."

EXTENSIONS OF OFFICERS' SERVICE

The undermentioned officers have been selected for retention on the active list as indicated:—

(i) PERMANENT OFFICERS.

To be retained to age 50

Wing Commanders—George Raymond Albert Deacon, M.C., John Claude Malcolm Lowe, Charles Clever Miles, M.C., Rowland Francis Storrs Morton, George Horace Paty Padley, John Hilliard Simpson, Evelyn Hayley Sparling, A.F.C., Arthur Thomas Whitelock.

Squadron Leaders—Malcolm Frank Browne, John Victor Read, M.B.E., George Cecil Rhodes.

Flight Lieutenants—William Arthur Harvey, Harold Walter St. John, D.F.C., Alfred Percival White.

To be retained to age 48

Flight Lieutenants—John Forbes Andre Day, A.F.C., James George Western, M.B.E.

To be retained to age 45

Flight Lieutenant—John Harold Hagon.

(ii) OFFICERS RETAINED IN THE SERVICE TO COMPLETE TIME FOR RETIRED PAY.

To be retained to age 55

Flight Lieutenants—William Smith, John William White, Frank Henry Whitmore, M.B.E., D.S.C.

(iii) MEDIUM SERVICE OFFICER—SERVICE TO BE EXTENDED TO COMPLETE 11 YEARS.

Flight Lieutenant—Geoffrey Augustus Graydon Johnston.

(iv) SHORT SERVICE OFFICERS—SERVICE TO BE EXTENDED TO COMPLETE 7 YEARS.

Flying Officers—John Reginald Shelton Agar, Richard Vernon Alexander, Glen Atkinson, Reginald James William Barnett, Roger Brammer Brown, James Alonso Dixon, Cuthbert Dumaresque Paul

Franklin, Ronald Henry Harris, Lennox Stanley Lamb, Jack Cuthbert Larking, Douglas Paterson Lee, Brian Everard Lowe, Charles Maclean Humberstone Outram, John Ross Palmer, Murray Armstrong Payn, Henry Neville Gynes-Ramsbottom-Isherwood, Frank George Laughton Smith, Edward Charles Smith-Ross, Alfred Threapleton, Charles Patrick Villiers, Arthur William Vincent, John Frederick Langenmayr Zorn.

CRANWELL COLLEGE

The following candidates have passed the June examination for admission to the R.A.F. College:—Butler, P. S., Lowry, W. E. M., Pike, J. M. N., Pearce, J. F., Mavor, L. D., Tennant, E., Dawson, P. W., Wilkins, J. T., Gethin, J. P. D., Grant, J. B., Hughes, J. M. M., Kettlewell, G. V. W., *Cox, H. F., Atkinson, C. F., Donne, M. S., Lynch-Blosse, E. H., Lee, R. H. A., Mead, I. A., Kelly, D. D. A., Hanlon, T. J., Oakeshott, A. R., Green, D. R. D., de Montmorency, R. H., Harrison, P. M. J.

KING'S CADET WHO HAS QUALIFIED FOR CRANWELL:—Bird, G. O. L.
HONORARY KING'S CADETS WHO HAVE QUALIFIED FOR CRANWELL:—*Archer, J. C.; ap Ellis, P. R.; *Measures, W. E. G.

*The admission of this candidate is subject to his passing a further medical examination.

ROYAL AIR FORCE GAZETTE

London Gazette, August 6, 1935
General Duties Branch

The following Flight Lieutenants are promoted to the rank of Squadron Leader (August 1): C. F. Toogood, A. W. Franklyn, M.C., C. A. Bouchier, D.F.C., G. M. Knocker, G. S. Hodson, A.F.C., M. C. Dick, A.F.C., C. E. Barraclough, L. F. Pendred, M.B.E., D.F.C., C. E. H. Allen, D.F.C., H. W. St. John, D.F.C., G. W. Birkinshaw, R. D. Starley, M.C., R. J. M. de St. Leger.

F/O. J. Heber Percy is promoted to the rank of Flight Lieutenant (June 14).

The following Pilot Officers are promoted to the rank of Flying Officer:—J. O. Hinks (March 29); C. H. Brandon, H. M. T. Eversfield (June 16); R. J. F. Craig, C. F. C. Wright (July 6).

Sqn. Ldr. S. B. Harris, D.F.C., A.F.C., is granted the acting rank of Wing Commander (unpaid) with effect from August 6; Lt. V. C. Grenfell, R.N., Flying Officer, R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (July 18); A.V.-M. N. D. K. MacEwen, C.B., C.M.G., D.S.O., is placed on the retired list at his own request (July 5); Air Comdr. E. D. M. Robertson, C.B., D.F.C., is placed on the retired list at his own request (August 1); Flt. Lt. H. E. Falkner is placed on the retired list at his own request (August 3); Flt. Lt. J. St. C. Arbuthnot is transferred to the Reserve, Class A (August 5); Lt. J. L. Moulton, R.M., Flying Officer, R.A.F., relinquishes his temporary commission on return to duty with the Royal Marines (July 16); Sub-Lt. P. A. R. Bremridge, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on resignation from the Royal Navy (July 17).

The short service commissions of the following Acting Pilot Officers on probation are terminated on cessation of duty:—A. G. Corbin (July 25); W. H. Carroll (August 1).

Stores Branch

Flying Officer on probation T. J. Kinna is confirmed in rank (July 20).

The following Flight Lieutenants are promoted to the rank of

LIGHTING OF W/T MASTS

The masts at Kidbrooke have now been dismantled.

NIGHT FLYING

Night-flying exercises without navigation lights will be carried out by R.A.F. aircraft within a radius of fifteen miles of Portsmouth, from August 12 to 16, 1935, from 2030 to 0545 hours. The aircraft will not exhibit navigation lights whilst flying above 2,000 feet, unless other aircraft are observed in the vicinity.

CIVILIAN FLYING SCHOOLS

Under the expansion scheme, elementary flying will no longer be taught at R.A.F. Flying Training Schools but at civilian schools. Advanced training will be given at the Flying Training Schools. Eight civilian schools have already been selected, namely: Flying Training, Ltd., Hanworth, the De Havilland School at White Waltham, near Maidenhead, the Phillips and Powis School at Reading, Brooklands Aviation Ltd. at Sywell, near Northampton, Reid and Sigrist Ltd. at Desford, near Leicester, The Bristol Aeroplane Co. at Yatesbury, Wilts, Air Service Training at Anstey, near Coventry, and the Airwork flying school at Perth.

Squadron Leader (August 1):—F. A. Skoulding, E. G. Keeping, H. J. Payne, C. T. Davis.

Sqn. Ldr. J. H. Dale is placed on the retired list (August 5).

Medical Branch

Flt. Lt. G. E. Church, M.B., Ch.B., L.R.C.P. and S., is promoted to the rank of Squadron Leader (August 1).

Miscellaneous

F/O. C. I. A. Jackson (Lieutenant, Royal Tank Corps) relinquishes his temporary commission on cessation of liability for service with the R.A.F. (July 15).

Commissioned Engineer Officers

The following Flying Officers on probation are confirmed in rank (July 20):—J. E. Atkins, C. W. Baker, M.B.E., P. McDiarmid, A.F.M., H. E. Newing.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

K. Maconochie is granted a commission as Flying Officer in class A (July 19); F/O. E. W. Percival is transferred from class A to class C (April 20); P/O. P. C. Pitt is transferred from class AA (i) to class C (June 26).

The following Flying Officers are transferred from class AA (ii) to class C:—J. R. M. Brunton (March 16); G. V. Kibblewhite (July 14). F/O. W. A. Hammerton is transferred from class C to class A (June 21).

The following Flying Officers relinquish their commission on completion of service:—A. C. C. Seligman (March 17); J. F. H. Bulman (August 6).

AUXILIARY AIR FORCE

General Duties Branch

No. 601 (COUNTY OF LONDON) (FIGHTER) SQUADRON.—E. G. E. Rayner is granted a commission as Pilot Officer (July 15).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Air Chief Marshal.—Sir Robert Brooke-Popham, G.C.V.O., K.C.B., C.M.G., D.S.O., A.F.C., A.D.C., to Department of Chief of the Air Staff, Air Ministry, 1.8.35; on appointment as Inspector General of the Royal Air Force.

Air Marshal.—Sir John Miles Steel, K.C.B., K.B.E., C.M.G., to Headquarters, Air Defence of Great Britain, Uxbridge, 1.8.35; on appointment as Air Officer Commanding-in-Chief vice A.C.M. Sir Robert Brooke-Popham, G.C.V.O., K.C.B., C.M.G., D.S.O., A.F.C., A.D.C.

Wing Commanders.—P. E. Maitland, M.V.O., A.F.C., to R.A.F. Station, Calshot, 29.7.35; for Navigation duties vice Wing Cdr. E. A. B. Rice, M.C., F. O. Soden, D.F.C., to No. 58 (B) Squadron, Worthy Down, 1.8.35; to command vice Grp. Capt. C. O. F. Modin, D.S.C., B. E. Baker, D.S.O., M.C., A.F.C., to H.M.S. *Courageous*, 18.7.35; for duty as Senior Air Force Officer vice Wing Cdr. L. H. Slatter, O.B.E., D.S.C., D.F.C.

Squadron Leaders.—S. M. Park, to No. 99 (B) Squadron, Mildenhall, 8.7.35; for flying duties vice Sqn. Ldr. J. G. S. Candy, D.F.C., H. A. Hamersley, M.C., to R.A.F. Station, Worthy Down, 29.7.35; for Engineer duties vice Flt. Lt. J. N. T. Stephenson. H. E. Walker, M.C., D.F.C., to D.O.I., Dept. of Chief of the Air Staff, Air Ministry, 29.7.35, vice Sqn. Ldr. A. P. Ritchie, A.F.C. E. T. Carpenter, A.F.C., to Headquarters, Western Area, Andover, 1.8.35; for Signals duties vice Flt. Lt. H. F. C. Southey. A. F. Somerset-Leeke, O.B.E., to R.A.F. Station, Upper Heyford, 1.8.35; for Engineer duties vice Flt. Lt. W. A. Harvey.

Flight Lieutenants.—A. D. H. Foster, to R.A.F. Station, Hawk-

inge, 29.7.35. H. J. Gemmell, to No. 3 Flying Training School, Grantham, 23.7.35. P. Kinsey, to Electrical and Wireless School, Cranwell, 29.7.35. H. J. Pringle, to Royal Air Force College, Cranwell, 29.7.35. M. Watson, to H.M.S. *Glorious*, 29.7.35. E. B. Grace to No. 14 (B) Squadron, Amman, Transjordan, 19.7.35. A. C. H. Sharp, to No. 1 Armament Training Camp, Catfoss, 1.8.35. G. N. Coward, to Marine Aircraft Experimental Establishment, Felixstowe, 2.8.35.

Flying Officers.—D. H. Marsack, to R.A.F. Depot, Middle East, Aboukir, 24.7.35. C. P. Villiers, to R.A.F. Station, Marston, 2.8.35.

Stores Branch

Flight Lieutenant.—D. A. W. Sugden, to No. 47 (B) Squadron, Khartoum, 16.6.35.

Accountant Branch

Flight Lieutenant.—T. P. E. Campbell, to No. 501 (City of Bristol) (B) Squadron, Filton, 2.8.35.

Pilot Officers.—H. C. Fleming, to No. 5 Flying Training School, Sealand, 2.8.35. R. O. Heath, to R.A.F. Station, Andover, 2.8.35. F. H. Shutt, to R.A.F. Station, Upper Heyford, 2.8.35.

Medical Branch

Flight Lieutenants.—F. W. P. Dixon, M.B.E., to R.A.F. Depot, Uxbridge, 29.7.35. R. G. Freeman, to R.A.F. Hospital, Cranwell, 1.8.35. H. J. Melville, to R.A.F. Station, Boscombe Down, 31.7.35.

Dental Branch

Flight Lieutenants.—W. D. Guyler, to R.A.F. Depot, Uxbridge, 12.8.35. B. L. Harrington, to Home Aircraft Depot, Henlow, 7.8.35.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

Aerial Black Marias?

It is probable that the new Kent County Police Headquarters at Maidstone will have a landing ground.

Another Caudron Record

M. Maurice Arnoux, flying a Caudron monoplane with Renault engine, set up a new speed record for 100 km. carrying a passenger. His speed was approximately 285 m.p.h.

A Long Range Model

A model aeroplane with a petrol-driven engine has been picked up in the sea after having flown 35 miles overland. It was launched from Cranbourne, in Hampshire.

Political Piloting

Capt. Dieudonne Costes, the French trans-Atlantic airman and test pilot, is to be a candidate at the next French election supported, probably, by the Croix de Feu.

Down Off Folkestone

During the filming of *The Conquest of the Air*, M. Dolfus, the French balloonist, came down in the water less than a quarter of a mile from the beach, in Folkestone Warren.

A Ministerial Flight

The French Air Minister, General Denain, acted as pilot of the Latécoere flying boat *Lieutenant de Vaisseau Paris* during a flight of nearly 400 miles from Cherbourg to Biscarosse.



At Cowes: Mr. C. R. Fairey, who has been made Commodore of the Royal London Yacht Club, at the helm of his yacht *Shamrock*.



A Pioneer's "Pou." M. Henri Mignet, designer, or, one might say, inventor, of the "Pou-du-Ciel" with his personal machine. The engine is an Aubier et Dunne.

A Masterly Landing

In taking off from the Solent, an R.A.F. flying boat hit the mast of a yacht with its wing. Mast and sails went overboard, but the pilot of the flying boat managed to put his machine down safely.

Post Haste

Wiley Post left Seattle last Wednesday on a flight to Moscow. He was accompanied by Will Rogers the film actor. The flight will be continued beyond Moscow to Iceland and Greenland, and Post intends, apparently, to end the trip in New York.

A Lady to Reappear

Sir Charles Kingsford Smith is bound for Los Angeles to take his Lockheed "Altair" *Lady Southern Cross* from storage. He will fly it to New York whence it will be shipped to England. Then he will attempt to beat Scott and Black's England-Australia record of 2 days 4 hr. 34 min. His old *Southern Cross*, incidentally, has been taken over by the Australian Government.

Twenty-five Years Ago

From "Flight" of August 13, 1910.

"A new record in British aeronautics was set up in the small hours of Sunday morning last when Mr. E. T. Willows, in his little airship, successfully completed a voyage from Cardiff to London."

An Aid to Industry

An important part of a machine in a Northants factory broke during a recent week-end. The defective part was rushed to Sywell Aerodrome by car, conveyed by a specially chartered aeroplane to works at Lincoln, and flown back on the Sunday night. During the night the machine was refitted and the factory was able to open at the normal hour on the Monday morning, thus averting a stoppage of work involving hundreds of employees.

A Parochial "Pou"

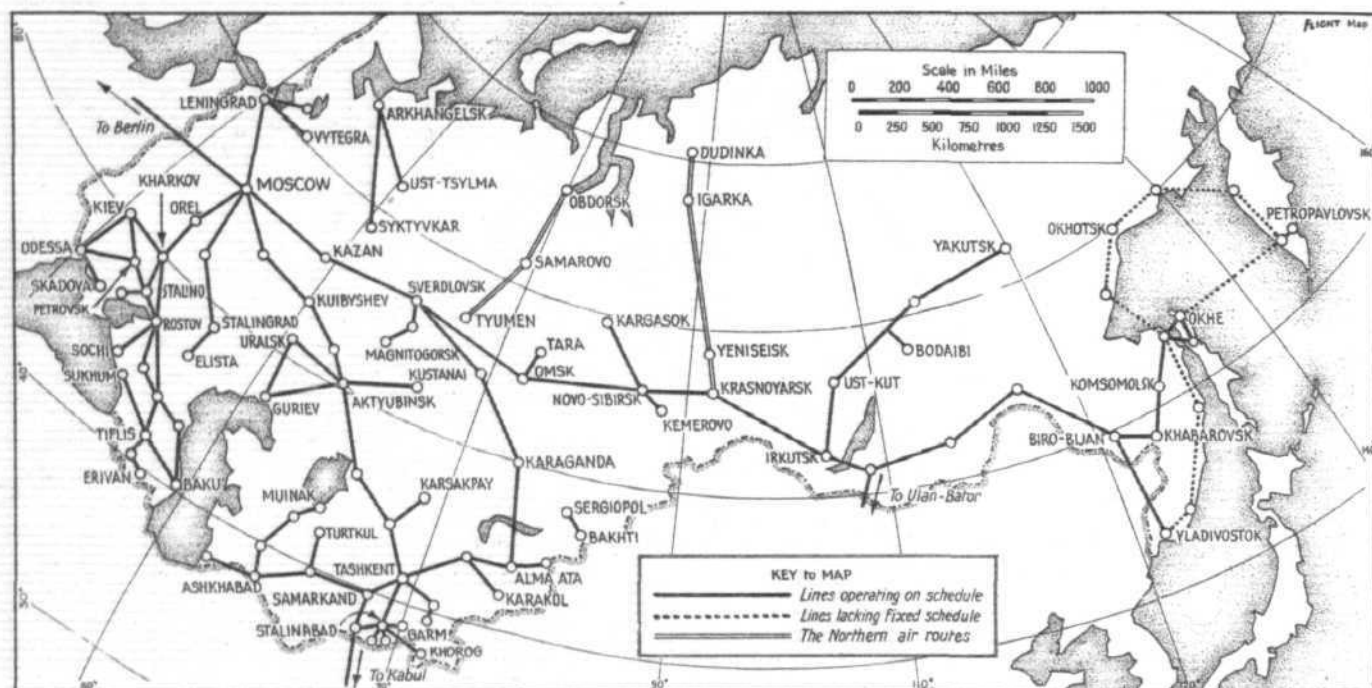
A Rangoon clergyman is building a "Pou-du-Ciel" incorporating certain features not mentioned in M. Mignet's book. He is fitting a 15 h.p. engine which, he hopes, will give a speed of 60 m.p.h. and a ceiling of 12,000 ft. For the tail wheel he is using a miniature tyre issued as a sample by the manufacturers. The landing wheels he obtained from a traveller in tyres who, by mistake, had included aeroplane wheels in his stock.

The Way of an Eagle

A pilot of the Ontario Air Service, noticing a heronry with an eagle's nest in a nearby tree, approached to examine the birds. The eagle, a giant of its kind, believing that the aeroplane intended to damage its nest, flew straight at the machine. Fearing serious damage if a collision occurred, the pilot endeavoured to out-manceuvre the bird and eventually managed to shake it off. This, of course, is by no means the first encounter a pilot has had with one of these birds.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —



SPANNING ASIA: Soviet Russia's air services as they are to-day. The longest trunk route is that from Moscow to Vladivostok, covering some 6,000 miles. A southern route connects the capital with the Ukraine, the North Caucasus and with Transcaucasia, while a south-eastern route reaches Tashkent and the cotton-growing area of Turkestan.

THE WEEK AT CROYDON

This is Service! : More Night Flying : Travelling Microbes : Rising Passenger Figures : Saving Time : Croydon's Silent Service

THE thrill of the week was provided by a Frenchman, whose British car—"Ah, perfide Albion!"—broke down one lunch time near Versailles. He wired to the manufacturer at Blackpool and the necessary spares were placed aboard a United Airways machine and flown to Heston. Inner Circle Air Lines then took over and flew the package to Croydon, where it just caught the Imperial Airways machine for Paris. So the repair was doubtless made the same evening—"Vive l'Angleterre!"

Capt. Pugh, of Commercial Air Hire, Ltd., reports that night flights over London have definitely increased in popularity since the new swimming pool has been opened opposite the airport. Brilliant festoons of fairy lights reflected in the water form a really enchanting spectacle from the air.

Air Dispatch, Ltd., have their Avro 642 back again on the Le Touquet service. It has been fitted with a new wireless set, and it is rumoured that the steward has invented another new cocktail during his interval of repose.

There is an increasing air traffic in different serums, mainly from Germany. Some of these are for trans-shipment to boats for America and special shipping instructions about keeping the serums at the correct temperature during the voyage accompany the consignments. One dreads to think of what might happen in the case of some strapping young serum, some growing lad of the microbe world, if, in consequence of being stowed near the boilers, he attained the stature of a rabbit and went galloping around the decks.

The internationality of this air transport business was indicated last week by a letter received by one of the managers. It was in Dutch, and attached to it were letters in German and Italian, as well as some notes in English, and concerned some passenger's lost umbrella or something.

Passenger figures in and out of Croydon during July, to and from the Continent only, were very satisfactory and, in fact, reached the record figure of 16,000 for the month. The previous month's figures showed about 15,000 passengers.

One company at least has kept a record of the time taken between the arrival of a machine and the departure of the passenger cars for London ever since the new scheme—of examining the passports first and dealing with the Customs clearance afterwards—was introduced. The result has been satisfactory, as, in spite of the fact that two or three machines have come in together on occasion, and even though at times there has been a hold-up over a foreign passport or some dutiable article in a passenger's baggage, an average time of ten minutes for formalities has been kept.

Some firms are less lucky than others in that their machines have passengers from no fewer than five countries at certain times of the day, and the necessary passenger lists and immigration cards cannot be sorted out so quickly. Much depends, also, on the number of aliens aboard a machine. Most British passengers pass almost straight through. Aliens are occasionally refused permission to land, in which case the company has to send them back by the next machine—equivalent to keeping them aboard a boat until it sails again. This always infuriates managers, who thus have to reserve one precious seat for the "undesirable alien."

There was a smart bit of work last week by the Airport "silent service," when the C.I.D., who are seldom seen or heard, but who are with us all the time, are understood to have arrested a passenger going aboard the Imperial 3 p.m. service for Paris. The alleged offence concerned card-sharping. Quite a lot of card playing goes on when flying, and packs of cards are usually to be obtained from the stewards.

Commercial Aviation

Moral: Don't play for high stakes with strangers when flying high. You may lose your head owing to the thin air and your money may vanish—into thin air.

Talking about the C.I.D.—or is it the Customs who deal with smuggling?—I have heard that drug smugglers always pass peacefully through Customs and other formalities, *but* are followed to London and nabbed just when they are handing the booty over to the receiver in some obscure public-house or café.

A party of twenty-four British athletes left Croydon last

week-end for Cologne, twelve by Imperials and twelve by D.L.H. They were afterwards going on to Munich for the contests there.

Becoming one of the hardy annuals, like Maj. Anson's cricket team's trip to Holland each year, is an annual outing of master butchers, who for the second year in succession have patronised Olley Air Services. This time fourteen of them, in two "Dragons," flew to Ostend and back last Sunday. Capt. Olley himself had a midnight trip back from Berck to Croydon on Sunday.

A. VIATOR.

OUR MERCANTILE AIR FLEET*How the Flying Equipment of the Various Operating Companies is Made Up*

SEVERAL interesting facts emerge from a study of the table below, which gives the number and types of commercial machines in actual operation in this country. This table, though based on the lists recently published by the Air Ministry, has, as far as possible, been brought up to date, and modifications have been made where the official list is obviously behind the times. No claim is, however, made that the list is absolutely correct, as information has not been obtainable from three of the firms.

It will be seen that the ubiquitous D.H. "Dragon" still

heads the list, though the "Rapide" and the D.H. 86 are coming along rapidly. With the "Fox Moth," too, in the fourth place, side by side with the Handley-Page "Heracles," the De Havilland company certainly has reason to be proud of itself. The "Dragon," of course, virtually made unsubsidised air line operation possible.

Among the "miscellaneous" machines are several singleton machines of obsolescent type as well as a number of light aeroplanes which are used by the companies for school and minor charter work.

	Airspeed "Courier."	Airspeed "Envoy."	Avro 642.	Avro 652.	Armstrong Whitworth "Argosy."	Armstrong Whitworth XV.	Boulton Paul 71A.	D.H. 84.	D.H. 86.	D.H. 89.	D.H. "Heracles."	D.H. "Fox Moth."	H.P. 42.	Monospar.	Saro "Cloud."	Saro "Windhover."	Short "Scion."	Short "Calcutta."	Short "Kent."	Short "Scylla."	Spartan "Cruiser."	Miscellaneous.	Total.
Imperial Airways	—	—	—	12	1	6	12	1	5	12	4	—	8	—	—	—	—	4	3	12	—	4	41
Aberdeen Airways	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	4
Atlantic Coast Airways	—	—	—	—	—	—	—	4	—	—	—	1	—	1	—	—	—	—	—	—	—	—	4
Blackpool and West Coast Air Services	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	6
British Continental Airways	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Commercial Air Hire	—	—	1	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	6
Crilly Airways	—	—	—	—	—	—	—	3	—	—	—	1	—	—	—	—	—	—	—	—	—	—	4
Highland Airways	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5
Hillman's Airways	—	—	—	—	—	—	—	4	3	7	—	2	—	—	—	—	—	—	—	—	—	—	19
Jersey Airways	—	—	—	—	—	—	—	1	6	12	—	—	—	—	—	1	—	—	—	—	—	—	10
North Eastern Airways	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
Northern and Scottish Airways	—	—	—	—	—	—	—	2	—	1	—	—	—	—	—	—	—	—	—	—	—	—	3
Olley Air Services	—	1	—	—	—	—	—	1	—	12	—	1	—	—	—	—	—	—	—	—	—	—	5
Portsmouth, Southsea, and I.O.W. Aviation	3	1	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	7
Provincial Airways	—	—	—	—	—	—	—	3	—	—	—	1	—	—	—	—	—	—	—	—	—	—	4
Railway Air Services	—	—	—	—	—	—	—	6	2	2	—	—	—	—	—	—	—	—	—	—	—	—	10
Southend Flying Services	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	4
Spartan Air Lines	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	5	—	—	8
United Airways	—	—	—	—	1	—	—	3	—	3	—	—	—	—	—	—	—	—	—	4	—	—	13
Western Airways	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5
Total	3	5	1	2	2	6	2	36	16	22	4	8	8	5	1	1	3	4	3	2	9	23	166

Alderney on the Map

ONE or two little snags in the way of unexpected rock outcrops have tended to put back the work on Alderney's aerodrome, but this should be ready before the beginning of next month.

In due course the Jersey- or mainland-bound machines will call at Alderney on request and a flying boat service will connect it with Guernsey. At present Jersey Airways are running an amphibian on a daily (Wednesday excepted) service between Jersey and Guernsey.

During the period between August 1 and 5, incidentally, no fewer than 1,200 single journey passengers were carried by Jersey Airways, two-thirds of whom travelled between Southampton and St. Helier.

European Equipment

ALTHOUGH the valuable list of registered civil aeroplanes in this country and Europe, which is compiled by the Air Ministry, can never, at any moment, be up-to-date, several interesting facts emerge from a study of the July edition.

At that time twenty-three British machines, some of very obsolete type, were listed as being in service on the Continent. Eleven American machines of assorted and widely different types are also given, but for some obscure reason not a single Douglas is among them. Even in May, seven had been delivered to or ordered by K.L.M., four by Swissair, one by Austria, one by Italy, one by Spain and one by D.L.H.

The largest single fleet was that operated by D.L.H., 205 machines in all, with Air France as runner-up with 159 machines. Imperial Airways had 42. Of the D.L.H. fleet, no fewer than 31 were Junkers F.13s. and 28 were Ju.52s.

For Japan

AIRSPEED "Envoys" have been chosen for use on the service between Japan and Manchukuo, linking Tokio with Hsinking and Dairen. At present this route is operated only during the summer months.

Growing Traffic on the Batavia Route

THE results of the K.L.M. duplication of the Amsterdam-Batavia service have, so far, been very favourable. In both directions there has been an increase of 37.8 per cent. in the mail carried as compared with last year's figures, and an increase of 133.7 per cent. in the number of passengers carried.

Southend Opening

ON September 18 the new Southend-on-Sea municipal airport, which is, of course, already in full use, will be officially opened in the presence of the Mayor and Corporation, and with a very thorough fanfare of trumpets. Mr. Brian Allen, a director of Southend Flying Services, is hard at work on the organisation, and he tells us that last week the Southend-Rochester ferry carried some 1,000 passengers. All of which is very heartening.

Brian Allen Aviation, Ltd., which has the sales rights of the Stinson in this country, is expecting delivery of the latest model at the end of this month. The new Stinson has a number of improvements, including hydraulically operated flaps and wider doors, and will be sold in this country at a competitive price. Mr. Leslie Irvin, incidentally, has recently joined the board of the company. Mr. Irvin, it will be remembered, is the owner of a Stinson "Reliant" which he uses extensively in connection with his business.

Commercial Aviation**HESTON HAPPENINGS***Increased Traffic Figures : Newspapers to the Isle of Wight : Charter Miracles :
The Cow Menace*

AN increasing commercial trend is shown by comparison of July traffic figures for 1934 and 1935. In July, 1934, 4,268 take-offs or landings, apart from those made by the flying school, were registered by the Heston Control. Of these, 32 per cent. were made by commercial aircraft. In July, 1935, 4,495 aircraft movements were registered, 43 per cent. being commercial. On one day alone 637 movements were registered—the flying school, which is here included, being responsible for 406 of them. Thus it may be said that, on an average, an aeroplane takes off or lands once in every minute of the controlled period between 10 a.m. and 8 p.m. at Heston.

In the month of July Jersey Airways' London services carried 1,337 passengers—28 per cent. more than in the same month last year. Spartan Air Lines carried 1,061 passengers; Portsmouth, Southsea and Isle of Wight Aviation, Ltd., carried 567 passengers; and United Airways carried 279 passengers. 206 passengers were carried on the Inner Circle between Heston and Croydon. In all, 3,525 passengers passed through Heston last month on regular services, a 45 per cent. increase on the figures for July, 1934.

During the August Bank Holiday week-end (Friday to Tuesday inclusive) Jersey Airways carried 346 passengers, Spartan Air Lines carried 404 passengers, and Portsmouth, Southsea and Isle of Wight Aviation, Ltd., carried 154 passengers. Since the beginning of August the latter company has been running three aeroplanes a day on special freight services carrying evening newspapers to the Isle of Wight, a task to which their Airspeed "Couriers" are very well suited. One leaves London at 2.30 p.m., and two more at 5.10 p.m., the daily load of newspapers averaging between 1,000 and 1,500lb.

The other day, at 10.25 a.m., a man strolled into the Heston Traffic Hall and expressed a wish to get to Deauville immediately. The traffic staff replied that an Olley Air Services

machine was leaving Croydon for that destination in five minutes. They rang up Olley's, who agreed to wait a few minutes. They placed the passenger in a school machine which happened to be standing idle and Capt. Ferguson ran him over to Croydon.

Just after 6 o'clock on another evening a man walked into Air Commerce's office and asked to be taken to Dundee at once. This, again, was easily arranged, and Mr. Stace had him in the air in under fifteen minutes.

Heston charter companies had their hands full with Press work when the *Princess Ena* caught fire in the Channel. Birkett Air Service were called up at about 6 p.m. with instructions to bring back photographs of the burning ship to reach the newspaper office within four hours. They got out the "Merlin," flew 200 miles to the burning ship, cruised round for about half an hour taking photographs, and returned to Heston in 3½ hours.

The deplorable results of parking an aeroplane in a field of cows are well known. Recent job-cards issued by the Airwork Service Department show that the cow menace is becoming really serious. In a Hertfordshire pasture one of the engineers was at work last week surrounded by horned perils and compelled, possibly, to distract the bull's attention with an improvised "muleta" of fabric on a spar while he did his best with a spanner. The trouble begins with bovine curiosity and develops into a passion for licking off the dope, the cow only pausing to sharpen its horns on any convenient surface. This raises questions affecting the law, and is a veritable challenge to the Milk Marketing Board. The farmer apparently incurs no liability for partially digested fabric and splintered spars. But is not the pilot liable for the immediate effects of overdoping the cow's multi-stomached fuel system? Will ground engineers have to take yet another licence—analytical chemistry—to enable them in such cases to "sign out" not only the aeroplane but the herd of cows?

Blind in America

TWELVE airports across America have been selected for the installation of the Army Air Corps blind landing system already fully described in *Flight*. Of these that at Washington, D.C., will be purely for experimental work and will be the first to be equipped.

In addition to the standard Army radio installations, the Bureau of Air Commerce is contemplating the use of a chain of lights on the blind approach line to the airport. Lights let in flush with the surface down the runway, to give some visual indication to the pilot after he has ceased to use the radio and is flying almost solely on his directional gyro, are to be used.

"Homing" Transmissions

DURING the hours of darkness, and on receipt of special requests from pilots, brief experimental transmissions for "homing" purposes will be made on 893 m. from Croydon. In daylight, of course, the normal transmission will be sufficient for the purpose.

A Cyprus Service

FOR the benefit of tourists to the Cyprus mountains the Egyptian Airways Company is to institute a service from Lydda, in Palestine, to Cyprus. The service will start from Cairo and pick up passengers from Iraq at Lydda. The journey to Cyprus takes about five hours from Cairo.

Foreshadowed

EMPIRE and transoceanic developments would seem to be foreshadowed in the registrations G-ADHK, ADHL and ADHM, three Short flying boats for Imperial Airways, Ltd. Also registered is G-ADHJ, a Short monoplane float seaplane which might quite conceivably be the upper machine of the Mayo composite aircraft, the first trials of which are now so eagerly awaited.

A Douglas De Luxe

SOME further details are now to hand of the Douglas D.C.3 which, as has already been announced in *Flight*, is the next development from the Los Angeles Douglas factory. It is expected that the first of a batch of ten will be delivered to American Air Lines for their day and night services in January. The accommodation for thirty-two passengers has been arranged so that sixteen may be carried when the machine is used as a sleeper, and the comfort, it is said, will be considerably better than that of the Curtiss "Condor." [If this is so it will be luxurious indeed.—Ed.]

The performance will be better than that of the D.C.2 as, although the size is larger, the fuselage is perfectly circular in section, and the wing loading has been raised. The engines will be the new G series Wright "Cyclones" giving 850 h.p., with over 900 h.p. for the take-off.



THE BASS STRAIT SERVICE: One of Holyman's Airways' D.H. 86s used on the service between Melbourne, Launceston and Hobart.

Commercial Aviation

Duplication to Australia

AS already suggested in *Flight* as an immediate possibility, the service between Calcutta and Singapore will be duplicated on and after October 1. It appears probable that, at the same time, Qantas Empire Airways will also duplicate the services on the Singapore-Brisbane section. A bi-weekly service between London and Calcutta is, of course, already being operated.

The D.C.A. in Sweden

L. T. COL. F. C. SHELMEKDINE, the Director General of Civil Aviation, is on holiday in Sweden, where he has been entertained by A.B. Aerotransport. Last week-end, in answer to a broadcast S.O.S., Mrs. Shelmerdine travelled from Sweden to Truro, Cornwall, a matter of 1,100 miles, in little more than twenty-four hours.

Blind Landings in England

WITH the statement that the Civil Aviation Department of the Air Ministry has asked for the co-operation of the N.P.L. in various radio problems, one learns that the problems of blind landings and approaches are to be seriously tackled in this country. Both Germany and the United States have been seriously attacking these problems during the past few years.

In addition to the points affecting blind landings, experiments concerning which are probably to be made at Gatwick and Gravesend as well as at Croydon, the use of short-wave D/F over a long range will be studied, and the development of a suitable warning device for signalling the proximity of obstructions is also expected.

The Air Ministry took over the Vickers "Viastra," previously owned by the Prince of Wales, some time ago for wireless experiments, and arrangements have been made for Imperial Airways pilots to fly the machine with experimental equipment. Concerning short-wave D/F, Imperial pilots will probably be invited to send out signals at prearranged times while on the Empire routes, so that data can be collected.

High Wings for America?

WILL there be a return to the high-wing monoplane for commercial work? Certainly there is a feeling on at least one American air line that the low-wing monoplanes now in use unduly limit the outlook of passengers. In this country, of course, vision has always been a main consideration, and it is a significant fact that the new Armstrong-Whitworth "Tiger"-engined monoplanes now under construction for Imperial Airways are of the high-wing type.

Possibly this question of visibility has influenced the design of the latest American feeder-line machine—the Timm T-800 ten-seater developed by the Timm Aircraft Company at Glendale, California. It is understood that Pan-American Airways have shown interest in the type.

The single high wing is of wooden construction, cantilevered beyond the two engine nacelles. There is a pronounced taper in the thickness of the wing inboard of these. From the nacelles two struts run to the lower fuselage longerons, and a more or less conventional type of split undercarriage is employed. Structurally, the wing consists of box spars with laminated spruce caps and webs with ribs of plywood, and both duralumin and fabric are used for the wing covering. Welded chrome steel tubes are employed in the construction of the fuselage.

Two alternative power plants are available—the Wright "Whirlwind" R-975E2, rated at 420 h.p. at 3,000ft., or the Pratt and Whitney "Wasp Junior" SB, delivering 400 h.p. at 5,000ft. In either case long chord cowlings and variable pitch airscrews are employed.

The main data applying to this interesting machine are, according to our contemporary, *Aero Digest*, as follows: Span, 53ft. 7in.; length, 39ft.; wing area, 460 sq. ft.; weight, 5,560 lb., and gross weight, 9,000 lb. The estimated performance figures are: Top speed at 5,000ft., 200 m.p.h.; landing speed, with flaps, 56 m.p.h.; initial rate of climb, 1,600ft./min.; service ceiling, 24,000ft.; and range, with ten passengers at cruising speed, 740 miles.

HERE AND THERE

A Douglas with English Engines: "Heck" Production: Foreign Visitors

On Business

CAPT. E. W. PERCIVAL, who recently flew from England to Africa and back in a day, left Gravesend at 7.35 a.m. last Friday for Stockholm, where he saw his agents. He arrived at Vasteras, near Stockholm, after covering the 965 miles in six hours with a standard "Gull."

"Hawks" at Heston

MR. LACAYO, who recently joined the sales staff of Airwork, Ltd., at Heston airport, has taken delivery of a new de luxe model "Hawk," which is being used as one of the demonstration aircraft for his firm. It represents the last word in luxury in the open two-cockpit class, and was fully described in *Flight* of August 1, 1935.

"Raduno de Littoria"

THE Royal Aero Club of Italy, organising the International Competition named "Raduno de Littoria," to take place on August 24-30, have notified the Royal Aero Club that entries will be received up to August 15, 1935, and entries at double entry fee up to August 18. Particulars can be obtained from the Royal Aero Club, 119, Piccadilly, London, W.1.

The Lowe-Wylde Fund

CONTRIBUTIONS to the Lowe-Wylde Fund continue to come in. Mr. E. C. Gordon England, to whom donations should be sent at the London Air Park, Feltham, Middlesex, reports the following since last week's list was published:—

	£	s.	d.
S. P. Tyzack	25	0	0
British Aircraft Mfg. Co., Ltd.	15	15	0
J. E. Chorlton	2	2	0
Anonymous	2	2	0
Sir Christopher Bullock	1	1	0
C. H. Jackson	0	10	6

Visitors from Abroad

THE following visitors from abroad are at present in this country and can be communicated with at the Royal Aero Club, 119, Piccadilly, London, W.1:—Dr. Zahra (Aero Club

of Egypt); J. J. Veasey (Kenya); P. Stone, D. N. Bunsha, S. J. Majmudar, N. D. Mulla-Feroze, A. C. Gazdar (all of Bombay); C. Sinnocks (U.S.A.); J. Lacombe (Aero Club de France); Capt. E. C. Johnston (Director of Civil Aviation in Australia); F. Eager (Australia); A. Herd (British East Africa); and Col. F. P. Lahm (American Military Attaché in Paris).

Hendy "Heck" Production

RAPID progress is now being made with the production of the Hendy "Heck," that lively little cabin two-seater which, with a 200 h.p. "Gipsy Six" and a retractable undercarriage, has a top speed of 180 m.p.h. No fewer than twenty-five are on the stocks at the Parnall factory at Yate, Gloucestershire.

Incidentally, the photograph published in *Flight* last week of one of these machines which had "landed on its tummy," was testimony to the sturdy construction; the amount of damage was infinitesimal. The sole distributing agents for the Hendy "Heck" are Aircraft Exchange and Mart, Ltd., 7, Park Lane, London, W.1.

The "Pegasus" Douglas

SPLENDID results have been obtained with two Douglas passenger aircraft using Bristol "Pegasus III" engines. As recorded in *Flight* last week two Douglas D.C.2s using these engines have been constructed to the order of the LOT Air Line of Poland.

The first machine was flown from Santa Monica to New York, a distance of approximately 2,700 miles, some days ago, for shipment to Cherbourg. The second machine has also now been flown to New York, and a cable informing the Bristol Company of this fact states: "Second machine made perfect journey New York. No trouble of any kind. Exactly 15 hours cruising at 2,000 r.p.m., 22 inches boost. At 12,000 feet corrected air speed 180 m.p.h., cylinder head temperatures 165°C. Fuel consumption 28.8 Imperial gallons per hour and oil consumption 5 Imperial pints per hour."

The smooth running of the engines and the complete absence of vibration is said to have excited very favourable comment in U.S.A.

THE INDUSTRY

Safety First

FIRST Aid kits, although not brought into use until an accident happens, are really in the nature of a precaution. Carrying one in an aeroplane is a sensible "safety-first" sort of precaution even though that aeroplane is a small privately owned one, because when it is wanted it is wanted very urgently, and having it to hand may be the means of saving one's own or one's passenger's life.

One of the lightest and most compact outfits we have seen is that being marketed by Mr. Lindsay



Neale, who is in association with Chamier, Gilbert-Lodge and Co., of Aldwych House, Aldwych, London, W.C.2, and from whom the outfits may be obtained for 7s. 9d. The case is of strong canvas, and nothing of vital importance has been omitted. An outfit like this is, of course, equally suitable for carrying in a motor car, or for that matter any other vehicle.

Dive-bombing in Sweden

THE Hawker "Harts" acquired some time back by the Swedish Air Force have recently been engaged on dive-bombing trials, using land and sea targets. It is understood that the experiments have supported the evidence given during years of dive-bombing practice in England of the deadly accuracy of this form of attack. During the steep dive, in which the machines are aimed at the target, speeds up to, and at times over, 300 m.p.h. are attained before the bombs are released and the machines pulled out on to a level keel.

Sweden has acquired the licence to build "Harts" in her own factories, and it is understood that a new batch of fifty machines is now under construction. Swedish-built "Pegasus" engines are specified.

A number of "Osprey" Fleet fighter reconnaissance biplanes form part of the equipment of the new aircraft carrier *Gottland*. News has reached London that four of these machines, delivered a few months ago, have completed extensive service trials, which included catapulting from launches, and have given perfect satisfaction. A further order has been placed. The Swedish "Ospreys" are fitted, like the "Harts," with "Pegasus" engines. Our own Fleet Air Arm "Ospreys" employ the Rolls-Royce "Kestrel" water-cooled unit.

Silence from Denmark

"CELLOCOL" is the name of a material produced by a Danish firm of concrete engineers in Copenhagen. This material, which has considerable sound and heat insulating properties, is manufactured in standard sheets 4 ft. long by 3 ft. wide and in thicknesses of $\frac{1}{2}$ in., 1 in., 1½ in., and 2 in. The material is made in two grades, "Cellocol S" and "Cellocol T." It is the former which is used in aircraft. The latter is used mainly for heat insulation. Larger sizes can be manufactured to order.

The thermal conductivity of "Cellocol" is about 0.21 B.T.U. per square foot per hour, and the weight is remarkably low at 1.5-1.7 lb./cu. ft. The sound absorption depends upon the manner in which the material is mounted in the cabin walls of an aircraft. Average figures of 0.4 have been obtained over a wide range of frequencies. Particulars concerning "Cellocol" may be obtained from Christiani and Nielsen, Ltd., Romney House, Marsham Street, London, S.W.1.

Keeping Iraqi Peace

LATE last autumn a number of Hawker "Audax" biplanes with Bristol "Pegasus" engines, were supplied to the Iraqi Air Force. They have now completed 300 hours flying apiece, and another squadron of machines of similar type are on order. Five machines of the first squadron were flown to Baghdad in formation last September. The remaining seven were crated and shipped. Since their arrival in Iraq they have been employed, under the command of Major Jewad, chief of the Iraqi Air Force, for police patrol work, the settlement of tribal disputes, high-speed communications, ambulance and survey work.

The machines were built to carry two machine guns, bombs, navigational equipment for day and night flying, emergency rations, drinking water and fuel for several hundreds of miles flying. Nevertheless, their level speed is 180 m.p.h., and they are able to climb to 10,000 ft., with full load, in seven and a-half minutes.

"Seapak"

THOROUGH sound proofing of cabins of commercial aircraft is a most important, but hitherto somewhat neglected, requirement for all machines which have to carry passengers.

One of the most generally used substances for this purpose is flameproofed "Seapak," a substance made from the silky fibres of the hard shelled pod of the Ceipa tree. This material both absorbs external sounds and acts as a temperature insulator, thus not only making an aeroplane cabin quiet, but also assisting in maintaining an equable temperature.

"Seapak" is handled in this country by Mr. H. L. Williams, of 72, Oxford Street, London, W.1. Telephone, Museum 5974. Its light weight is one of its great advantages for use in aircraft. A square yard of the standard plain flameproofed "Seapak" weighs only 8½ oz.

Marconi Wireless for Japan

THE Japan Air Transport Company has ordered five Marconi AD43/44 aircraft installations for use on its machines operating on the air route between Fukuoka and Urusan. These sets, which will be operated with fixed aerials, will be fitted in Japan, and their wave range will be 42.5-70 metres instead of the normal 50-100 metres. Both filaments and rotary transformer will be fed from their aircraft 12-volt battery and engine-driven dynamo.

PUBLICATIONS RECEIVED

Annual Report of the Board of Regents of the Smithsonian Institution, 1933. price 70 cents, Superintendent of Documents, Washington, D.C., U.S.A.

Relativity, by F. W. Lanchester, price 12s. net, Constable, 10, Orange Street, London, W.C.2.

Max Immelmann—Eagle of Lille, by Franz Immelmann, price 8s. 6d. net, John Hamilton Ltd., 32, Bloomsbury Street, London, W.C.1.

Instruments: Category "X" Licence, by R. W. Sloley; Aeronautical Engineering Series, Ground Engineers, price 5s. net, Sir Isaac Pitman and Sons Ltd., Kingsway, London, W.C.2.

Aeroplane Structures. By A. J. Sutton, Pippard and Capt. J. Laurence Pritchard. Second Edition. Price 21s. net. Longmans, Green and Co., Ltd., 39, Paternoster Row, London, E.C.4.

Germany's Air Force. By Otto Lehmann-Russbueldt. Price 3s. net. George Allen and Unwin, Ltd., 40, Museum Street, London, W.C.1.

The Flying Flea ("Le Pou-du-Ciel"). By Henri Mignet. Price 7s. 6d. net. Sampson Low, Marston and Co., Ltd., 100, Southwark Street, London, S.E.1.

The Royal Air Force: Careers and How to Join. By T. Stanhope Sprigg. Price 2s. 6d. net. Sir Isaac Pitman and Sons, Ltd., Kingsway, London, W.C.2.

Aeronautical Research Committee Reports and Memoranda, No. 1624: Tests on Models of Armstrong-Whitworth Four-engined Monoplane, by W. L. Cowley, R. Warden and G. A. McMillan, October, 1933, price 9d. net; No. 1630: Abstract: An Application of Matrices to Oscillation Problems, by W. J. Duncan and A. R. Collar, 1934, price 4d. net; No. 1631: Forces and Moments on a "Puss Moth" Model, by A. S. Batson, February, 1934, price 6d. net, H.M. Stationery Office, Kingsway, London, W.C.2.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

(Published, August 15, 1935.)

28804. ASBOTH, O. Aircraft of the helicopter type (432,124).

34723. BENDIX AVIATION CORPORATION. Brakes (431,854).

1454. WILD, P. H. Propulsion, manoeuvring, reduction of resistance to propulsion, and the stabilisation of ships, boats, and other watercraft (431,787).

4740. BOULTON PAUL, LTD., NORTH, J. D., HUGHES, H. A., and DOE, A. Gun turrets for aircraft (431,879).

4742. BOULTON PAUL, LTD., NORTH, J. D., HUGHES, H. A., and DOE, A. Gun mountings (432,132).

5034. BOULTON PAUL, LTD., NORTH, J. D., HUGHES, H. A., and DOE, A. Rapidly-removable cover for gun turrets (432,134).

21607. BENDIX AVIATION CORPORATION. Clutch-actuating mechanism (431,971).

22090. SHORT BROS. (ROCHESTER AND BEDFORD), LTD., and GOUGE, A. Construction of cantilever wings and other aircraft structures (431,896).